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THE

SCIENTIFIC AND LITERARY

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THE

SCIENTIFIC AND LITERARY TREASURY

BY

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'THE TREASURY OF KNOWLEDGE,' 'BIOGRAPHICAL TREASURY,' ETC. ETC.

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PREFACE TO THE PRESENT EDITION.

THE SCIENTIFIC AND LITERARY TREASURY was subjected a few years ago to a thorough revision, when not only were all the principal articles rewritten, but upwards of fifteen hundred new articles were supplied. So large, in fact, were the alterations that it might be considered rather a new book than a new edition. An attempt was then made to impress upon the work a more exact and scientific character than preceding editions had pretended to, whilst its utility as a dictionary for popular reference was steadily kept in view.

The present edition has been enlarged by adding a Supplement of fifty-one pages, comprising upwards of six hundred articles. It is hoped that this considerable extension will materially increase the usefulness of the work and help to maintain its popular character.

THE

SCIENTIFIC AND LITERARY TREASURY.

A is the first letter, and the first vowel, of the alphabet in every known language, except the Amaric, a dialect of the Ethiopic, and the Runic; and is used either as a word, an abbreviation, or a sign. If pronounced *open*, as in FATHER, it is the simplest and easiest of all sounds; the first, in fact, uttered by human beings in their most infantile state, serving to express many and even opposite emotions, according to the mode in which it is uttered. A has therefore, perhaps, had the first place in the alphabet assigned to it. In the English language, it has four different sounds:—the long slender English, as in *fate*; the long Italian, as in *far*; the broad German, as in *fall*; and the short Italian, as in *fat*. Most other modern languages want the slender English sound. Among the Greeks and Romans, A was used as an arithmetical sign: by the former for 1; by the latter for 500, or, with a stroke over it, for 5000. The Romans employed it very frequently as an abbreviation also, which practice we still retain: thus A.B. *Artium Baccalaureus*, Bachélor of Arts; A.C. *Ante Christum*, before Christ; A.D. *Anno Domini*, in the year of our Lord; A.H. *Anno Hegiræ*, in the year of the Hegira; A.M. *Anno Mundi*, in the year of the world; *Ante Meridiem*, before noon; *Artium Magister*, Master of Arts; A.U. *Anno Urbis*, in the year of the City; A.U.C. *Anno Urbis Conditæ*, in the year from the building of Rome; &c.——A, *a*, or *aa*, in Medical prescriptions, is put for *ana*, or equal parts of each.——A, in Music, is the sixth note in the diatonic scale; in Algebraic notation it usually denotes, like the other early letters of the alphabet, a known quantity; in Logic, an universal affirmative proposition; in Heraldry, the *dexter chief*, or chief point in an escutcheon; and it is the first of the dominical letters in the calendar.

AARD'VARK (earth-hog: *Dut.*), the *Orycteropus Capensis*, an animal common in Southern Africa, which feeds entirely upon ants, and is remarkable for the facility with which it burrows deep in the earth to avoid its pursuers, and for the instinct it displays in securing its insect prey. It bears a closer relation to the armadillos than the ant-eaters, with which it was formerly associated.

AB, in the Hebrew calendar, the 11th month of the civil year, and the 5th of the ecclesiastical. In the Syriac calendar, it is the last of the summer months.

A'BACA, or Manilla Hemp [see MUSACEÆ, FIBRES].

ABACIS'CUS (*abakiskos*, the *dim.* of *abax*, a slab: *Gr.*), in Ancient Architecture, one of the square compartments of Mosaic pavements.

ABACK', in Nautical language, the position of the sails when they are flattened against the mast by a change of wind or alteration in the ship's course. The sails are sometimes *laid aback*, for the purpose of avoiding a sudden danger.

A'BACUS (*abax*, a slab: *Gr.*), a sort of cupboard or buffet used by the Romans, and which in times of great luxury was plated with gold.——ABACUS, in Architecture, the superior or crowning member of the capital of a column. It is intended to give breadth to the top of the shaft, and afford a larger surface for the reception of the architrave. In the Corinthian order, at least, it was at first intended to represent a square tile laid over a basket; and it still retains its original form in the Tuscan, Doric, and Ionic orders, but in the Corinthian and Composite, its four sides or faces are arched inwards, having a rose or some other ornament in the middle of the curves, and its corners are cut off.——ABACUS, in Arithmetic, an ancient instrument for facilitating operations: still used in teaching. Its form is various: that employed by the Greeks was an oblong frame, having wires stretched across it, and perforated beads or ivory balls were strung on the wires. In that used by the Romans, counters were slid along grooves. But that most generally adopted in Europe, is made by drawing parallel lines or fixing wires, distant from each other at least twice the diameter of a counter or ball. The latter, placed on the lowest line, signifies 1; on the second, 10; on the third, 100; on the fourth, 1000; and so on. The Chinese abacus, termed a *Swan-pan*, has wires like that of the Greeks. The abacus was much used in Europe during the middle ages: but, instead of lines or wires, it had a covering of cloth *chequered*, that is, disposed in squares; and on these the counters were placed. The term *Exchequer* is derived from the use of this chequered square in calculation. The very words employed in Greek and Latin to express calculation indicate the means anciently used in aid of that process. *Psephizo*, I calculate (*Gr.*), is derived from *psephos*, a pebble; and *calculo*, I calculate (*Lat.*), from *calculus*, a pebble. There were also other inventions similarly denominated: thus the ABACUS PYTHAGORICUS, a multiplication table invented by Pythagoras; and the ABACUS LOGISTICUS, a rectangled triangle, whose sides, forming the right angle, contain all the numbers from 1 to 60, and its area the products of each two of the opposite numbers. This is also called a *canon of sexagesimals*. ——ABACUS (*abak*, sand: *Phœn.*), among ancient mathematicians, was a table strewed over with dust or sand, on which they drew their figures.

ABAFT', or AFT, in Nautical language, towards the stern: thus, abaft the main mast means, between the mainmast and the stern.

ABATE'MENT (*abattre*, to pull down: *Fr.*), in Law, a term variously applied. The abatement of a nuisance means its forcible removal.——A plea in abatement in an action at law, is a plea showing matter for quashing the declaration.——A suit in chancery is said to abate when, in consequence of some event subsequent to its institution, such as the death of a party whose interest is not terminated by his death, there is no person before the court by whom or against whom the suit can be prosecuted.——ABATEMENT, in Heraldry, something added to a coat of arms, in order to lessen its true dignity, and point out some imperfection or stain in the character of the person who bears it. The *Baston*, which indicates bastardy, is the only abatement now used. It consists of a line drawn from the left or *sinister* corner of the top of the shield, to the lower part of the opposite side, but not quite down to the circumference; it is therefore part of a Bend-sinister.

A'BATIS (*Fr.*), trees cut down and laid with their branches turned towards the enemy, so as to form a defence for troops stationed behind them.

ABAT'TOIR (*abattre*, to knock down: *Fr.*), the name given by the French to the public slaughter-houses established in Paris by a decree of Napoleon, in order that the cattle should not be driven through the capital, to the annoyance and danger of the inhabitants. These large buildings consist of slaughter-rooms, built of stone, with every arrangement for cleanliness, &c., and of ox and sheep pens.

AB'BE' (an abbot: *Fr.*). Before the French Revolution, the term *abbé* designated a very numerous class, who, from their name, should be superiors of abbeys, but who had little or no connection with the church: they followed a course of theological study, in hopes that the king would confer on them part of the revenues of a monastery. When this was done, it was on condition of their taking orders within a year after their preferment: a clause not always observed. They were engaged in every kind of literary occupation, and exerted an important influence on the character of the country. There was scarcely a family of distinction in France in which an abbé was not found as a familiar friend and spiritual adviser.

AB'BESS, the superior of a nunnery, or other religious community of women. She has the same authority as an abbot, but cannot exercise any spiritual function.

AB'BEY (*abbaie: Fr.*), a religious house governed by a superior, under the title of an abbot or abbess. The term was often applied, also, to the church attached to the establishment. Many of the abbeys of England, after their dissolution under Henry VIII., were changed into cathedrals. Those dissolved by that king had a yearly revenue, which has been estimated at 2,853,000*l.*; an almost incredible sum, considering the value of money in those days.

AB'BOT (*abbas: Lat.*; from *abba*, father: *Heb.*) denotes the head of a monastery of men. From an early period abbots were in the habit of taking holy orders, that they might be qualified to exercise the ministerial office for the monks. Strictly speaking, an abbot should be superior to a prior, the latter being in many cases appointed by the former to take charge of a lesser establishment. But the distinction is not always observed. Abbots, though having supreme power in their monasteries, were originally subject to the bishops of the dioceses in which their convents were situated; but they gradually, to a great extent, threw off this subjection, assuming the authority and insignia of the episcopal office, and taking their seats in councils: hence the mitred and croziered abbots. Anciently the ceremony of creating an abbot consisted in clothing him with the habit called *cuculla*, or cowl, putting the pastoral staff into his hand, and the shoes called *pedales* on his feet; but at present it is only a simple benediction.——It was because certain abbots and priors in England, in right of their monasteries, held lands of the crown, for which they owed military service, that they obtained the title of LORDS, and were summoned, as barons, to parliament. Twenty-six mitred abbots and two priors sat in the House of Lords in the reign of Henry VIII.

ABBREVIA'TION (*abbreviatio*, from *abbrevio*, I shorten: *Lat.*), a contracted manner of writing words so as to retain, in most cases, no more than the initial letters. Such abbreviations were in common use with the Romans, as they are with us, to save time and space. [For the most usual abbreviations, see the different letters.] ——ABBREVIATION, in Music. One dash through the stem of a minim or crotchet, or under a semibreve, converts it into as many quavers as it is equal to in time; two dashes into semiquavers; three into demisemiquavers; and so on. When minims are connected together like quavers, semiquavers, &c., they are to be repeated as many times as if they were reduced to such notes. An oblique dash through the 2nd, 3rd, and 4th lines after an arpeggio, signifies that it is to be repeated; for quavers, a single dash being used; for semiquavers, a double one; and so on.

ABDICA'TION (*abdicatio*, from *abdico*, I abdicate: *Lat.*), strictly speaking, is the resignation of a dignity, particularly a regal one.——The abdication of the emperor Charles V., in 1556, and that of Napoleon at Fontainebleau, in 1814, are the two most remarkable instances of abdication in modern times.

ABDO'MEN (*Lat.*, from *abdo*, I conceal: *Lat.*), that part of the body which is usually called the belly. It contains the viscera more or less immediately connected with digestion, and the kidneys which secrete the urine. By anatomists the abdomen is divided into three anterior regions, viz. the *epigastric*, or upper one; the *umbilical*, or middle one; and the *hypogastric*, or lower one: there is also one posterior region, called the *regio lumbaris*.

ABDOMINA'LES (*abdomen*, the belly: *Lat.*), a sub-order of malacopterygian fishes, so named from having the ventral fins placed on the abdomen at a distance from the pectoral fins. The salmon, trout, herring, pike, carp, and many other freshwater fishes, fall into this sub-order.

ABDUC'TION (*abduco*, I lead away: *Lat.*), the crime of unlawfully taking away, either by force, fraud, or persuasion, the person of another. The abduction of a child under ten years of age is felony; if she is older, but has property, or is presumed to be entitled to it, and is taken away for the purpose of marriage or deflement, it is also felony; if she is under sixteen years of age, taking her from the protection of her parents is a misdemeanour.

ABDUC'TOR (same *deriv.*), in Anatomy, a name given to several muscles, on account of their serving to open or draw backwards the parts into which they are inserted.

ABE'LIANS, or A'BELITES, a Christian sect, who, while they enjoined matrimony, prescribed perfect continence in that state, after the pretended example of Abel, whence the name.

ABELMOS'CHUS, the seed of an Egyptian plant, nat. order *Malvaceæ*, which resembles musk in its perfume, and is used by the Arabians in their coffee.

A'BER, a Celtic term, signifying the mouth of a river: as Aberdeen, the mouth of the Dee.

ABERRA'TION (*aberratio*, from *aberro*, I wander away: *Lat.*), in Astronomy, an apparent motion of the fixed stars occasioned by the progressive motion of light and the motion of the earth in its orbit. If the earth were at rest, or if light travelled instantaneously from a star to the observer, the star would be seen in its true place. But neither is the case; for while the ray of light is passing to the observer, the earth is moving in its orbit. The effect of this is the same as if the ray obeyed two impulses making an angle with each other, one in a direction from the star to the observer, and the other in a direction opposite to the earth's motion on its axis; in which case, according to the ordinary mechanical laws, the result would be the same as that of an impulse in the direction of neither of the original impulses, but compounded of both, and the ray would seem to come from a place different from that really occupied by the star.——ABERRATION, in Optics, a deviation of the rays of light when refracted by a lens or reflected by a speculum, in consequence of which they are prevented from meeting in the same point. Aberrations are of two kinds, one arising from the figure of the reflecting or refracting body, the other from the unequal refrangibility of the different coloured rays which, united together, constitute *white* light, and which, being separated by the lens, give rise to the production of colours.

ABET'TOR (*abedan*, to incite. *Sax.*,, in Law, a person who advises or encourages another to the commission of a crime. If present at its perpetration, he is treated as a principal; if absent, as an *accessory before the fact*. The abettors of almost all felonies, whether present or absent, are considered as guilty as the actual felon. [See ACCESSORY.]

ABE'YANCE (*beyer*, to expect: *Norm. Fr.*), in Law, the expectancy of an estate or possession: thus, if lands be granted to one person for life, with reversion to the heirs of another, the reversion remains in abeyance until the death of that other, since a living person can have no heirs. A peerage descending to co-heiresses is in abeyance. It is a fixed principle of law, that the fee-simple of all lands is in somebody, or else in abeyance.

AB'IB (an ear of corn: *Heb.*), the first month of the Hebrew ecclesiastical year. It contains parts of our March and April. The Chaldee name of *Nisan* is now usually given to this month.

A'BIES (a fir-tree: *Lat.*), in Botany, a genus of coniferous trees, including several species of fir.

ABJURA'TION (*abjuro*, I deny on oath: *Lat.*), a forswearing or renouncing by oath. In old law, it signified a sworn banishment, or an oath taken to forsake the realm for ever: in its modern and now more usual signification, it applies to persons and doctrines only.

ABLACTA'TION (*ablacto*, I wean: *Lat.*), a sort of ingrafting of trees, in which the graft is left on its proper stock until it is fully incorporated with the new stock; when cut off, it is, as it were, *weaned* from the tree.

AB'LUENTS (*abluo*, I wash away: *Lat.*), diluting medicines, or such as dissolve, and carry off impurities from any part of the body.

ABLU'TION (same *deriv.*), a religious washing of the body, still used by the Turks and Mahomedans. It originated in the obvious necessity of practising cleanliness for the prevention of diseases in hot countries, for which purpose it was constituted a sacred rite; and by an easy transition, the purity of the body was made to typify the purity of the soul.

ABNOR'MAL (*ab*, from *norma*, a rule: *Lat.*), that which is irregular, or a deviation from the usual plan.

ABOARD', in Nautical language, within a ship. Also, when a vessel gets entangled in another, it is said to be *aboard of it*.

ABOMA'SUS, the fourth stomach of

ruminating animals, in which the process of digestion is effected.

ABORI'GENES (*ab origine*, from the beginning: *Lat.*), a name given to the original inhabitants of any country, or those occupying it when it first became known, and of whose origin nothing certain has been ascertained.

ABOR'TION (*abortio*, from *aborior*, I perish: *Lat.*), in a *figurative* sense, any production that does not come to maturity, or any design or project which fails before it is properly completed.——In Medicine, the unnatural expulsion of the fœtus after the sixth week and before the sixth month of pregnancy. Before the sixth week it is termed a *miscarriage*, and after the sixth month a *premature labour*.

ABOUT', in Nautical language, the situation of a ship immediately after she has tacked.——ABOUT SHIP, an order to the crew to prepare for tacking.

AB'RACADAB'RA, a term of incantation formerly used as a spell, and worn about the neck as a charm against several diseases, particularly fever.

ABRA'SION (*abrado*, I scrape off: *Lat.*), in Medicine, the corroding or wearing, by sharp and acrimonious humours or medicines.

ABRA'XAS, or ABRASAX', the name of the angelic Prince whom Basilides of Alexandria, the chief of the Egyptian GNOSTICS, supposed to have been set over 365 heavens, each peopled with its own order of angels. The word was probably Egyptian, and employed by Basilides when he found that if written in Greek the letters made up the number 365.——ABRAXAS or ABRASAX STONES are gems, sometimes called *Gemmæ Basilidianæ*, found in Egypt, upon which are represented the human body with the head of a cat and the feet of a reptile. The name of *Abrasax stone* is, in modern times, applied to a variety of gems that exhibit enigmatical compositions.

ABREAST', in Nautical language, a term applied to two or more ships, when ranged side by side. A ship is said to be *abreast of a place* when opposite to it.

ABREU'VOIR (*Fr.*), a watering-place, or any place dug for retaining water, as in camps.

ABRIDG'MENT (*abréger*, to abridge: *Fr.*), a contraction which brings the contents of a book within a short compass. The art of abridging well consists in taking only what is material and substantial, and rejecting all superfluities, whether of sentiment or style. In this light, abridgments are eminently serviceable to all whose occupations prevent them from devoting much time to literary pursuits. To abridge well requires a thorough knowledge of the subject. Montesquieu says, 'Tacitus abridged all, because he knew all.'

AB'SCESS (*abscedo*, I go away from: *Lat.*), in Medicine, an inflammatory tumour containing purulent matter.

ABSCIS'SA (*abscindo*, I cut off: *Lat.*), in Geometry, one of two lines, by which is measured the distance of a point, whose position is required to be ascertained, from two given intersecting lines, the other of the two first mentioned lines being called the *ordinate*. The point and the two given lines, which to facilitate the investigation are usually assumed to be at right angles to each other, must be on the same plane. The abscissa and the ordinate form the *coordinates*, which being known, the position of the point is known. The point of intersection of the two given lines is called the *origin*.

ABSCIS'SION (*abscissio*, from same *deriv.*), in Rhetoric, a figure of speech by which the speaker stops short, leaving his hearers to draw their own inferences from the facts he has stated.——In Astronomy, the cutting off the light of a planet, by another outstripping it and reaching a third planet before it.

ABSENTEE' (*absens*, absent: *Lat.*), a word of modern times applied to landowners and capitalists who expend their incomes in another country.

ABSIN'THINE (*absinthium*, wormwood: *Lat.*), the bitter principle of wormwood.

ABSOLU'TION (*absolutio*, from *absolutus*, freed from: *Lat.*), a religious ceremony of the church of Rome, in which the priest uses the formula 'Ego te absolvo a peccatis tuis.' I absolve thee from thy sins. The Council of Trent asserted that the priest has power of himself to absolve from sin. But this, it is said, is subject to the repentance of the individual and his submission to the requisite penance. The fathers of the Protestant church maintain that God alone can forgive and deliver from sin; and that a judicial power over the souls of Christians is conferred neither on priests nor on teachers.

AB'SOLUTISM, in Theology, a doctrine ascribed to the Calvinists, according to which God is supposed to act from mere pleasure in regard to the salvation of mankind. Absolutism is the grand obstacle to an union between the Lutherans and Calvinists.——In Politics, a power in the supreme head of the state above the control of law, to act according to his own will in the government of the people.

ABSOR'BENTS (*absorbeo*, I swallow up: *Lat.*), in Medicine, calcareous earths, or other substances which remove acids from the stomach.

ABSOR'BENT VESSELS, or ABSORBENTS, in Anatomy, extremely minute and numerous vessels opening on various parts of the body. Those on the undersurface of the smaller intestines are termed *lacteal absorbents*, or *lacteals*, their office being to absorb the digested elements or *chyle*, that it may be mixed with the blood. The *lymphatic absorbents*, or *lymphatics*, take up a transparent substance, *lymph*, and are found in great abundance opening on the skin. Every part of the body has lymphatics, by which waste particles are absorbed and removed.——In Botany, the fibres of the roots of plants, which draw nourishment from the surrounding earth, are sometimes termed *absorbents*.

ABSORP'TION (*absorptio*, from same *deriv.*), in Physiology, the conveyance to the circulating organs of a due supply of materials for the growth and support of the system; and removal, by the same means, of decayed and useless portions.

ABSTER'GENTS (*abstergeo*, I wipe away: *Lat.*), in Medicine, substances used to cleanse the body from those impurities which are not to be removed by simple abluents.

AB'STINENCE (*abstinentia*, from *abstineo*, I abstain: *Lat.*), in the Roman Catholic Church, the refraining from the use of certain kinds of food, such as meat, eggs, milk, &c., which are forbidden to members of that church on particular days. It differs from *fasting*, which is a refraining from all kinds of food during a certain period.

AB'STRACT (*abstractus*, from *abstraho*, I withdraw from: *Lat.*), a concise but general view, or analysis, of some large work; in which sense it differs from an *abridgment* only by its being shorter, and by its entering less minutely into particulars; and from an *extract*, as this last is some part or passage of the work.

ABSTRAC'TION (*abstractio*, from same), in Logic, that operation of the mind by which, in contemplating an object, it attends to some circumstances or qualities belonging to it, to the exclusion of all others. This faculty enables us to generalize, and is directly opposed to *composition*. By the latter, we consider those things together, which, in reality, are not joined in any one existence: by abstraction, we consider those things separately and apart, which, in reality, do not exist apart.——ABSTRACTION, in its passive sense, implies occupation with one's own thoughts, to the exclusion of external objects.

ABSUR'DUM, REDUC'TIO AD (reduction to an absurdity: *Lat.*), a mode of demonstration in which the truth of a proposition is established, not by direct proof, but by showing that the contrary is *absurd*, or *impossible*.

ABUT'MENTS (*aboutir*, to abut: *Fr.*), the extremities of any body adjoining another, as the extremities of a bridge resting on the banks or sides of a river. Also the junctions or meetings of two pieces of timber.

ABYSS' (*abussos*, bottomless: *Gr.*), any very deep place.

ACA'CIA (*akakia: Gr.*), in Botany, a genus of leguminous trees, or shrubby plants, of which several hundred species are known to botanists. They bear white, red, or yellow flowers, and their leaves are frequently elegantly pinnate. Some of them yield *Gum Arabic*, *Gum Senegal* and *Catechu*; and the bark of others affords a large quantity of *tannin*. They abound in Australia and in Africa. Most of the Australian species do not bear true leaves (except when very young), but have in their place flattened leaf-stalks, termed by botanists *phyllodia*, which are green and simulate leaves.——ACACIA, in the Materia Medica, is the inspissated juice of the pods of the *Mimosa Nilotica* of Linnæus.

ACADEM'ICS (*academicus*, relating to the *Academy: Lat.*), certain philosophers who followed the doctrine of Socrates and Plato, as to the uncertainty of knowledge and the incomprehensibility of truth. Socrates is said by some to have declared that 'all he knew was, that he knew nothing;' and it is certain that, in giving instruction, he commenced by professing the limited amount of human knowledge. Those among the ancients who embraced the system of Plato, were called *Academici*, and were divided into a number of sects. Those who have done so since the restoration of learning, have called themselves *Platonists*.

ACAD'EMY (*Akademia*, a public gymnasium at Athens: *Gr.*), in Grecian Antiquity, a place in one of the suburbs of Athens, where there was a school for gymnastic exercises. It took its name from Academus, an Athenian, who is said to have resided there. Cimon, the Athenian general, became its owner about 450 B.C., and adorned the place with fountains and statues. He bequeathed the garden to the public, and it then became the resort of the lovers of philosophy. Socrates was wont to repair thither, but its greatest celebrity arose from its being the place in which Plato taught.——ACADEMY, in the modern acceptation, is a society of persons united for the pursuit of some objects of study and application, as the Royal Academy of Arts of London, the French Academy, the Royal Academy of Sciences of Berlin, &c. The first institution resembling an Academy, of which there is any account, was a society formed at Alexandria by Ptolemy Soter. The first academy of science, in modern times, was established at Naples, by Baptista Porta, in 1560; but it was abolished by papal interdict. From the beginning of the 17th century, academies became very numerous in Italy; and, after some time, they spread into other countries.

ACALE'PHÆ (*akalēphē*, a nettle: *Gr.*), in Zoology, a class in the sub-kingdom *Radiata*, composed of animals which have the power of stinging the skin when applied to it; whence the name. The jelly-fishes, the sea-nettles, and the Portuguese man-of-war belong to this class. Some of the jelly-fishes move by contractions of the disk; others by means of bands of cilia. The tribe to which the Portuguese man-of-war belongs are simply driven about by the wind.

ACANTHA'CEÆ (*akantha*, a thorn: *Gr.*), a natural order of plants growing chiefly within the tropics, and including several beautiful species cultivated in our hothouses. The genera, *Thunbergia*, *Justicia*, *Ruellia*, *Aphelandra*, &c., as well as the European ACANTHUS, belong to the order.

ACAN'THOPHIS (*akantha*, a thorn; and *ophis*, a serpent: *Gr.*), a genus of small venomous serpents, distinguished by a horny spine at the end of the tail. One species is Australian, and considered the most venomous serpent in the country.

ACANTHOPTERY'GII (*akantha*, a thorn; and *pterux*, a wing: *Gr.*), an order of fishes characterized by having spines in some of the fins, and the pharyngeal bones separate. The perch, red mullet, gurnard, mackerel, and other well-known fishes belong to this order.

ACAN'THU'RUS (*akantha*, a thorn; and *oura*, a tail: *Gr.*), a genus of herbivorous fishes found in tropical seas, the species of which have a strong movable spine on each side of the tail.

ACAN'THUS (*akanthos*, the acanthus: *Gr.*), in Architecture, an ornament representing the leaves of the acanthus, or herb bear's foot; principally employed in the Corinthian and Composite capitals.

A'CARUS (*akari*, a mite: *Gr.*), in Zoology, a genus of insects allied to the spiders and included in the order ARACHNIDA. The cheese mite is an Acarus.

ACAT'ALEPSY (*akatalēpsia*, incomprehensibleness: *Gr.*), among ancient Philosophers, the impossibility of comprehending something; uncertainty in science.

ACATHOL'ICI (*a*, not; and *katholikos*, catholic: *Gr.*), the name by which Protestants are distinguished by some Roman Catholic writers.

ACAU'LOSE or **ACAU'LOUS** (*akaulos*: from *a*, not; and *kaulos*, a stem: *Gr.*), among Botanists, a term used for such plants as have no stem.

ACCELERA'TION (*acceleratio*, from *accelero*, I hasten: *Lat.*), in Mechanics, the increase of velocity in a moving body. *Accelerated motion* is that which continually receives fresh accessions of velocity, and is either uniformly or variably accelerated. It is produced by some force which *continues* to act. When it is *uniformly* accelerated, the increments of velocity produced in equal times are equal. Gravity furnishes us with an example of a uniformly accelerating force. If, under the influence of such a force, a body moves through a certain distance in the first second, it will move through three times that distance in the next second, through five times that distance in the third second, and so on; and, during any *number* of seconds, it will move through the distance traversed in the first second, multiplied by the square of that number.——ACCELERATION, in Astronomy, is applied to express the increase of the mean angular velocity of the moon, which causes the time of her mean periodic revolution to be a little shorter than it was many centuries ago; also to the increase of the velocity of a planet in moving from the apogee to the perigee of its orbit: and to the apparent greater diurnal motion of the fixed stars than of the sun, whose apparent motion round the earth each day is retarded by his apparent motion in the opposite direction, due to his apparent annual revolution in the heavens.

AC'CENT (*accentus*: from *ad*, to; and *cantus*, a tone: *Lat.*), a modification of the voice in pronouncing certain words or syllables; also, the marks on the words or syllables. The grammatical accents are the acute, marked thus (´); the grave, marked thus (`); and the circumflex, marked thus ^). Accents are used abundantly in the ancient Greek language; but we totally neglect them, and attend only to *quantity*. The modern Greeks, on the contrary, neglect quantity, and lay great stress on the accented syllables. The French use accents to mark a difference of pronunciation, or to distinguish words which are spelt in the same way, but have a different meaning.——RHETORICAL ACCENT, or *emphasis*, is designed to give distinctness and clearness to language. In a sentence, therefore, the stress is laid on the most important word, and in a word on the most important syllable. When the accent falls on a vowel, that vowel has its long sound, as in *po'rous*; but when it falls on a consonant, the preceding vowel is short, as in *pot'ter*. Accents also not only give a pleasing variety and beauty to the modulation of the voice, but often enable us to ascertain the true meaning of the word.——ACCENT, in Music, is a stress, or forced expression, which is laid on certain parts of a bar or measure, and is intended to indicate the passions, either naturally by the voice, or artificially by instruments. Every bar or measure is divided into the accented and unaccented parts; the former being those on which the spirit of the music depends.——ACCENTS, in Mathematics, are employed to distinguish different quantities, which are expressed by the same letter, used more than once, to avoid the inconvenience of too many letters. Thus, one velocity being represented by V, another may be indicated by V', another by V''. &c.

ACCEP'TANCE (*accipio*, I accept: *Lat.*), in Commerce, is the act by which a person makes himself a debtor for a sum contained in a bill of exchange or other obligation drawn upon or addressed to him, which is done by his writing the word 'Accepted' on it, and signing his name.

ACCEP'TOR (*Lat.*, from same *deriv.*), the person who accepts a bill of exchange in the manner just mentioned.

AC'CESS (*accessus*, from *accedo*, I approach: *Lat.*), in Medicine, the beginning of a paroxysm: or a fit of some periodical disease.

AC'CESSORY (*accedo*, I approach: *Lat.*), in Law, a person who aids in the commission of some felonious action. There are two kinds of accessories, viz. *before* the fact, and *after* it. The first is he who commands or procures another to commit an offence; who, though he be absent when it is committed, is now regarded as much a principal as the actual offender. One who stands by and witnesses the commission of a crime, without attempting to prevent its commission, is also an accessory before the fact. The accessory after the fact is one who receives, comforts, or assists the offender, knowing him to be such.

AC'CIDENS, or **PER ACCIDENS** (happening by chance: *Lat.*), a term formerly used by Philosophers to indicate a something not following from the nature of things, but from some accidental quality. It is opposed to *per se*; thus fire was said to burn *per se*, but a heated iron *per accidens*.

AC'CIDENT (*accido*, I happen: *Lat.*), amongst Logicians signifies that which may be either absent or present, without affecting the essence of the species. Thus, a man may be swimming, or he may be a negro. The former is what is termed a separable accident, because it may be separated from the individual, who would not cease to be the same person when he issued from the water; the other is an inseparable accident, not being separable from the individual, for being once a negro he could never cease to be one.

ACCIDEN'TAL (*accidens*, happening by chance: *Lat.*), in Heraldry, an additional mark in a coat of arms, which may be either omitted or retained without altering its character.——ACCIDENTAL COLOURS, those colours which depend on affections of the eye, and not on light itself. Thus, if we look for a short time steadily at a red wafer placed on a white sheet of paper, on removing the eye from the wafer, a number of spots equal in size to the wafer, and of the complementary colour (green), will appear on the paper as the eye moves over it.——ACCIDENTAL POINT, in Perspective, that point where all the lines parallel among themselves meet the perspective plane.

ACCIP'ITRES (*accipiter*, a hawk: *Lat.*), an order of birds of prey, called also *Raptatores* and *Rapaces*. It includes the eagles, vultures, secretary birds, and owls, and all its members are characterized by having powerful hooked beaks and talons, coupled with great strength of wing.

ACCLAMA'TION (*acclamatio*, from *acclamo*, I cry out: *Lat.*), in Roman Antiquity, a shout raised by the people to testify their approbation or disapprobation of their princes, generals, &c. In the early times of Christianity, the bishops were elected by acclamation. The first German emperors were elected in the same way.

ACCLIMATIZA'TION (*Fr.*), the colonization of one country by the natural productions, whether animal or vegetable, of another, with the view of rendering them subservient to the necessities or pleasures of mankind. There is an Acclimatization Society in London, and another in Paris. Amongst birds, several species of pheasants, the capercailzie, and two geese, have been acclimatized in our island; and amongst quadrupeds, the fallow deer, wapiti, and eland. The common carp is another instance of an acclimatized animal.

ACCOLA'DE (*Fr.*: from *ad*, to; and *collum*, the neck: *Lat.*), the slight blow given to the neck or shoulder of him who is being knighted.

ACCOMMODA'TION (*accommodatio*, an adapting: *Lat.*), a term applied by oculists to the power of adjustment which every normal eye possesses, whereby it is enabled almost imperceptibly and unconsciously so to alter its focus as to receive in rapid succession the correct image of objects situate at different distances.——ACCOMMODATION BILL, in Commerce, a bill of exchange which has been accepted for the accommodation of the drawer without any consideration or value for the acceptance.

ACCOM'PANIMENT (*accompagnare*, to accompany: *Ital.*), an instrumental part added to a musical composition by way of embellishment, and in order to support the principal melody. When the piece may be performed with or without the accompaniment at pleasure, it is said to be *ad libitum*, but when it is indispensable, *obligato*.

ACCOM'PLICE (*ad*, to; and *complexus*, comprised: *Lat.*), in Law, a person who is privy to, or aiding in, the perpetration of some crime.

ACCORDATU'RA, an Italian word signifying *agreement in time*.

ACCOR'DION (*accordo*, harmony: *Ital.*), a musical instrument, of German invention, but now made in this country also. It consists of a double series of vibrating tongues, acted on by a current of air from a sort of bellows.

ACCOUNT'ANT-GEN'ERAL, an officer of the Court of Chancery, whose duty it is to take account of all the moneys paid into that court, and to pay money out under the order of the court.

ACCOU'TREMENTS (*accoutrer*, to equip: *Fr.*), the necessaries of a soldier, as belts, pouches, cartridge-boxes, &c.

ACCRES'CIMENTO (*accrescere*, to increase: *Ital.*), in Music, the increase, by one half its duration, given to a note by a dot.

ACCRE'TION (*accretio*, from *accresco*, I increase: *Lat.*), the increase or growth of a body by an external addition of new parts; shells and various other substances are thus formed.

ACCUBA'TION (*accubatio*, from *accubo*, I recline: *Lat.*), the posture used among the Greeks and Romans at their meals, which was with the body extended on a couch, and the head resting on a pillow, or on the elbow supported by a pillow.

ACEPH'ALA (*akephalos*: from *a*, without; and *kephalē*, a head: *Gr.*), a sub-class of molluscs, comprising those that are destitute of a head such as the snails possess. Those with bivalve shells, the oyster, cockle, &c., belong to this sub-class.

ACEPH'ALI (same *deriv.*), a sect of Christians, so called because they admitted no head or superior, either lay or ecclesiastical.

ACETA'BULUM (originally a vessel for vinegar, hence any small vessel: *Lat.*), in Anatomy, a round cavity in a bone, which receives the convex head of another, and thus forms that species of articulation termed *enarthrosis*. Also, the hip-bone.

ACE'TAL (*acetum*, vinegar: *Lat.*), a colourless inflammable liquid, the result of the slow oxidation of alcohol-vapour. It is composed of carbon, hydrogen, and oxygen. Further oxidation converts it into acetic acid.

ACETA'RIOUS PLANTS (*acetaria*, a salad: *Lat.*), those used in making salads, such as lettuces, cress, &c.

A'CETATES, certain neutral salts formed by the combination of acetic acid with a salifiable base, as the acetate of potash.

ACET'IC ACID (*acetum*, vinegar: *Lat.*), in Chemistry, an acid which is found ready formed only in the organic kingdom It may be produced by the oxidation of organic substances, such as alcohol: or their destructive distillation, in which way it is obtained from wood. It may also be procured from its compounds, which are termed *acetates*. Ordinary vinegar is a weak, and generally an impure, acetic acid. The strong acid is extremely volatile and inflammable, corrodes and cauterises the skin, and, when heated in contact with air, takes fire. The anhydrous acid is a heavy oil, and is composed of carbon, hydrogen, and oxygen. Sugar of lead is an acetate of lead.

ACETOM'ETER (*acetum*, vinegar: *Lat.*; and *metron*, a measure: *Gr.*), an apparatus for determining the strength of vinegar and other forms of acetic acid.

ACE'TONE (*acetum*, vinegar: *Lat.*), a volatile and highly inflammable liquid, obtained by subjecting acetate of lime, baryta, or lead, to dry distillation. It is a colourless limpid fluid, with a peculiar smell. It is one of the numerous combinations of carbon, hydrogen, and oxgen.

ACHÆ'NIUM (*a*, privative, *chaino*, I open: *Gr.*), in Botany, a dry one-seeded fruit, of which the skin or pericarp adheres closely to the seed, but can be separated from it. For instance, the seeds of the ranunculus and the rose are *achænia*. In the strawberry, the part which we eat is a succulent receptacle, bearing achænia upon its surface.

ACHER'NAR (*Arab.*), a star of the first magnitude in the constellation Eridanus; it is the α Eridani of astronomers.

ACHIEVE'MENT (*achever*, to finish: *Fr.*), in Heraldry, a shield of armorial bearings; but, more usually, a funeral shield or *hatchment*, fixed to the dwelling of a person recently deceased.

ACHLAMY'DEOUS (*a*, without; *chlamus*, a garment: *Gr.*), a botanical term for flowers which have neither calyx nor corolla.

ACHROMA'TIC (*a*, without; and *chroma*, colour: *Gr.*), in Optics, colourless.

ACHRO'MATISM (same *deriv.*), freedom from colour. It has been stated [see ABERRATION] that a ray of white light is decomposed into coloured rays, in passing through an ordinary lens, by reason of the unequal refrangibility of those rays. This was a serious objection in optical instruments; but the difficulty has been overcome by employing, instead of simple lenses, compound lenses with the parts made of glass having different dispersive power, which parts correct each other's aberrations. Telescopes and microscopes are thus rendered achromatic.

ACI'CULAR (*acicula*: *Lat.*), needle-shaped.

A'CID (*acidus*, sour: *Lat.*), in a general sense, denotes such things as affect the palate with a sour, sharp, and tart taste; but in Chemistry, it includes all those substances which change vegetable blues to red, and combine with the alkalis, metallic oxides and earths, so as to form the compounds called *salts*. Acids are distinguished, according to the proportion of oxygen which they contain, by the terminations *ic* and *ous*: as nitric acid and nitrous acid, sulphuric acid and sulphurous acid; the former termination denotes the larger dose or portion of oxygen, and the latter the smaller. When the prefix *hypo* is put to either of these, it denotes a degree below it in point of oxidizement; as hyposulphuric acid, an intermediate between the sulphuric and the sulphurous acid. When the prefix *hyper*, or *per*, is used, it indicates a higher degree of oxidation: as hyperchloric or perchloric acid, a compound containing more oxygen than chloric acid. Some of the metals form acids when combined with oxygen, manganese for example. Although oxygen is a constituent of the great majority of acids, this is not invariably the case; for instance, hydrochloric acid is a combination of chlorine and hydrogen, and hydrofluoric acid is a combination of fluorine and hydrogen.

ACIDIFI'ABLE (*acidus*, acid; and *fio*, I become: *Lat.*), capable of being converted into an acid by an acidifying principle, such as oxygen, chlorine, iodine, bromine, sulphur, fluorine, &c.

ACID'ULOUS (*acidulus*, a *dim.* of *acidus*, meaning subacid: *Lat.*), in Chemistry, a term expressing a slight degree of acidity.

ACINE'SIA (*akinēsia*: from *a*, not; and *kineo*, I move: *Gr.*), that interval of rest which takes place between the contraction and dilatation of the pulse.

ACOLLE' (collared, from *col*, the neck: *Fr.*), in Heraldry, a term used sometimes to denote two things joined together; at others, animals with collars or crowns about their necks; and at others, batons, or swords, placed saltier-wise behind the shield.

A'COLYTE (*akolouthos*, a follower: *Gr.*), a cleric belonging to one of the four inferior or *minor orders* of the Roman Catholic church. His office is to attend on those in superior or *holy orders*, to carry a light at mass, and in other solemnities, &c.

ACONI'TA (next), a poisonous alkaloid extracted from aconite, employed as an anodyne in neuralgic affections.

A'CONITE (from *Acone*, in the Crimea, famous for poisonous herbs), the plant wolf's-bane or monkshood (the *Aconitum napellus* of botanists: nat. ord. *Ranunculaceæ*), the flower of which resembles the hood of a monk; it is a violent poison.

ACON'TIAS (*Gr.*, from *akōn*, a dart), in Zoology, a harmless serpent, otherwise called the *Anguis jaculus*, or dart-snake, from its vibrating its body in the manner of a dart.

ACOTYLE'DONS (*a*, without; and *kotulēdōn*, a cavity: *Gr.*), in Botany, a class of plants whose seeds are destitute of cotyledons or seed lobes, such as sea-weeds, mosses, ferns, and lichens.

ACOUSMAT'ICI (*akousmatikoi*, from *akouo*, I hear: *Gr.*), in Grecian Antiquity, such disciples of Pythagoras as had not finished their five years' probation. The *Acousmatici* were instructed by bare positive precepts and rules, without reasons or demonstrations; and these precepts they called *acousmata*.

ACOUS'TICS (*akouo*, I hear: *Gr.*), that branch of science which treats of the laws of sound. It is usually divided into two parts, viz. *diacoustics*, which explains the properties of those sounds that come directly from the sonorous body to the ear; and *catacoustics*, which treats of reflected sounds. Almost all sounds that affect us are conveyed to the ear by means of the air; but water is a good conductor of sound; so also is timber. It must be observed, that a body, while in the act of sounding, is in a state of vibration, which it communicates to the surrounding air, and that the undulations of the air affect the ear, and excite in us the sense of sound.

ACQUIT'TAL (*acquitter*, to discharge: *Fr.*), in Law, a discharge, deliverance, or setting free of a person from a criminal charge. Acquittal is of two kinds; in law, and in fact. When two are indicted and tried for a felony, one as principal, the other as accessory, the principal being discharged, the accessory also is, by consequence, freed: in which case, as the accessory is acquitted by law, so is the principal in fact.

ACQUIT'TANCE (same *deriv.*), a discharge in writing for a sum of money, witnessing that the party is paid the same.

A'CRE, a measure of land, very general in name, but varying in different places as to the extent which it is intended to denote. The English statute acre contains 4 square roods, or 160 square poles of 5½ yards, or 4,840 square yards. 121 Irish acres are equal to 196 English; 48 Scotch to 61 English; and 1,000 English acres to 40·466 French ares.

ACROAMAT'IC (*akroamatikos*, from *akroaomai*, I hear: *Gr.*), in the Aristotelian schools, a denomination given to such lectures as were calculated only for the intimate friends and disciples of that philosopher, being chiefly employed in demonstrating some speculative or abstruse part of philosophy. The acroamatic lectures, called also *esoteric*, stood contradistinguished from the *exoteric*, which were adapted to a common auditory.

ACROCERAU'NIAN (*akron*, a summit; and *keraunos*, a thunderbolt: *Gr.*), an epithet applied to certain mountains of Epirus, which project into the Adriatic, and obtain their name from being often struck with lightning.

ACRO'GENS (*acron*, an extremity; *geno*, I spring from: *Gr.*), a class of flowerless plants, having the stems and leaves distinguishable, forming one division of the Acotyledones of Jussieu, and the Cryptogameæ of others. They grow only at the ends, whence the name. They consist of mosses, lycopodia, and ferns.

ACRON'YCAL (*akronukos*: from *akron*, an extremity; and *nux*, the night: *Gr.*), in Astronomy, an appellation given to the rising of a star above the horizon, at sunset; or to its setting, when the sun rises. *Acronycal* is one of the three terms for the rising of a star, used by the Greek poets to indicate the position of the sun in the ecliptic, or the season of the year; the other two being called *cosmical* and *heliacal*.

ACROP'OLIS (*Gr.*: from *akron*, a summit; and *polis*, a city), the citadel of a Grecian city, and particularly that of Athens.

ACROS'TIC (*akrostichon*: from *akron*, an extremity; and *stichos*, a line: *Gr.*), a poem so contrived that the first or last letter of each line, or word, taken together, will make a proper name, or some other word. Such trifles were formerly much more in fashion than at present. Sir John Davies, who wrote philosophical poems, composed 26 acrostics in honour of Queen Elizabeth, the first letters of the lines making the words *Elisabetha Regina*.

ACROSTO'LIUM (*akrostolion*: from *akron*, an extremity; and *stolos*, equipment: *Gr.*), in the Naval Architecture of the ancients, the extreme part of the ornament fixed on the prows of their ships, and sometimes used for striking the ship of an enemy. It was the custom to tear the *acrostolia* from the prows of the vanquished, as a token of victory.

ACROTE'RIA (*akrotēs*, the end: *Gr.*), in Architecture, small pedestals, upon which globes, vases, or statues stand at the ends or middle of pediments. It also sometimes denotes the figures themselves placed in such situations.

ACT (*actus*, from *ago*, I perform: *Lat.*), in a general sense, denotes the exertion, or effectual application, of some power or faculty. Act is distinguished from power, as the effect from the cause, or as a thing produced from that which produces it.——ACT, among Logicians, more particularly indicates an operation of the human mind in which sense, comprehending, judging, willing, &c., are called acts.——ACT is also used for the final resolution or decree of an assembly, senate, council, &c.——ACTS of parliament are called *statutes*; acts of the Royal Society, *transactions*; those of the French Academy of Sciences, *memoirs*; those of the Academy of Sciences at Petersburg, *commentaries*, and latterly *acts*; those of Leipsic, *acta eruditorum*; the decrees of the Lords of Session, at Edinburgh, *acta sederunt*, &c.——ACT, in a Dramatic sense, is the name given to a division of a drama, at the end of which there is a pause to afford rest to actors and spectators. In the ancient Greek drama, there were certain interruptions of the performance, during which the stage was left to the sole occupation of the chorus. Yet this division of the piece is not noticed, in express terms, by ancient writers; nor do we know on what authority Horace requires that there should be five acts in every dramatic composition. In what is termed the regular drama, the rule laid down by him is still observed, the acts being divided into smaller portions, called *scenes*.

ACT OF FAITH, or **AUTO-DA-FE**, a public solemnity, held in Spain and Portugal, and the countries subject to them, in which the sentences pronounced by the judges on heretics and infidels were read. It is, however, generally considered to include the cruel execution of those who were condemned to be burned. Everything was done to render the processions, &c., appalling: that all might be deterred from resisting the authority of the church, or hesitating to believe whatever had been declared an article of faith.

ACT OF GRACE, an act at the beginning of a new reign, or on other great occasions, by which sometimes a free pardon has been granted to criminals.

ACTS OF THE APOSTLES, a canonical book of the New Testament, which contains great part of the lives of St. Peter and St. Paul; commencing at the Ascension and continued down to St. Paul's arriva at Rome, after his appeal to Cæsar; comprehending in all about thirty years. St. Luke has been generally considered its author.

AC'TA DIUR'NA (daily proceedings: *Lat*), in Roman History, a journal containing the important occurrences of the time. It was first regularly published by direction of Julius Cæsar.

ACTA SENA'TUS (acts of the Senate: *Lat.*), minutes of the proceedings of the Senate; also first regularly published by order of Julius Cæsar.

ACT'IAN GAMES, games celebrated at Actium in honour of Apollo, thence called *Actius*, and revived with increased splendour by Augustus, in commemoration of the victory he obtained over Antony at Actium. They were celebrated every fifth year: consisted of shows of gladiators, wrestling, and other exercises: and were kept generally at Nicopolis, a city built by Augustus, near Actium.

ACTI'NIA (*aktis*, a ray: *Gr.*), a genus of Sea Anemones.

AC'TINISM (same *deriv.*), a name recently given to that property of the sun's rays which effects chemical combinations and decompositions, as shown in all the processes of photography, in contradistinction to their powers of heating and illuminating.

ACTIN'OLITE (*aktis*, a ray; and *lithos*, a stone: *Gr.*), a green mineral which generally occurs in fascicular crystals. It is a variety of hornblende, and occurs in metamorphic rocks.

ACTIN'OMETER (*aktis*, a ray; *metron*, a measure: *Gr.*), an instrument for measuring the force of the solar radiation. Various forms of apparatus have been invented.

AC'TION (*actio*, from *ago*, I act: *Lat.*), in Mechanics and Physics, is the pressure or percussion of one body against another. It is one of the laws of nature, that action and re-action are equal: that is, the resistance of the body moved is always equal to the force communicated to it; or, which is the same thing, the moving body loses as much of its force as it communicates to the body moved.——Action, in the Military art, is an engagement between two armies, or between different bodies of troops belonging to them.——Action, in Rhetoric, may be defined, the accommodation of the orator's voice, but more especially of his gesture, to the subject on which he speaks. Cicero tells us, 'that it does not so much matter what an orator says, as how he says it.' Horace, in his Art of Poetry, is no less explicit in setting forth its vast influence on mankind.——Action, in a Theatrical sense, is nearly the same with action among orators; but the actor adapts his gesture, &c., to an assumed character, whereas the orator is supposed to be in reality what his action expresses.——Action, in Painting and Sculpture, denotes the posture of a statue or picture, serving to express some passion, &c.——Actions, certain proceedings in the courts of common law for the recovery of rights: they are divided into real, personal, and mixed. The only remaining *real* and *mixed actions* are writ of dower and *quare impedit*, and, perhaps, ejectment. Recent legislation has altered the method of bringing these actions, but has not abolished them. They can only be brought in the Court of Common Pleas. *Personal actions* are those in which recovery of a debt is sought, or satisfaction for injury to person or property.

AC'TIONARY, in Commerce, a term used among foreigners for the proprietor of an action or share of a public company's stock.

AC'TIVE (*activus: Lat.*), in a general sense, denotes something that communicates motion or action to another: in which sense it stands opposed to *passive*.——Active, among Grammarians, an appellation given to words expressing some action, as I write, I read, &c.

AC'TOR (*Lat.*), in a Dramatic sense, is a man who enacts some part or character in a play. Actors were treated very differently, at different times, among the ancients. As long as the drama retained in Greece any degree of religious solemnity, they were treated with respect, and persons of rank did not hesitate to appear among them, but when acting became a profession, they were no longer considered to hold a respectable position. In Rome the first actors were buffoons, and during the Republic they continued to be despised; but, under the emperors, they gradually obtained some degree of consideration. In England the first actors were the servants of the great: whence the custom of companies belonging to the principal theatres calling themselves 'His Majesty's servants.'

AC'TRESS (*actrice: Fr.*), a female dramatic performer. Actresses were unknown to the ancients, among whom men always took the parts of women. Nor were they introduced on the English stage till after the Restoration.

AC'TUARY (*actuarius: Lat.*, an official who wrote down the proceedings of a court), the chief clerk, or person, who compiles minutes of the proceedings of a company in business.——Also, the clerk who registers the acts and constitutions of convocations.——One who calculates the value of life interests and annuities.

ACU'LEATE (*aculeatus*, from *aculeus*, a prickle: *Lat.*), an appellation given to anything that has *aculei*, or prickles.

ACU'MINATE (*acumen*, a point: *Lat.*), anything very much tapered to a point; if it is pointed, but without tapering, it is merely *acute*.

ACUPUNCTURA'TION, an oriental practice of puncturing diseased parts of the body with fine needles. In China and Japan, it has long been a part of surgery; and of late years it has obtained some repute in England, as a cure for chronic rheumatism.

ACU'TE (*acutus*, sharp: *Lat.*), an appellation given to such things as terminate in a sharp point or edge; thus we say an acute angle, acute-angled triangle, &c.: it is opposite to *obtuse*.——Acute, in Music, an epithet given to sharp or shrill sounds, in opposition to those called *grave*.——Acute Diseases, in Medicine, are distinguished from *chronic*, by being attended with violent symptoms, and requiring immediate aid chronic diseases are those which usually last long.

AD HOM'INEM, see ARGUMENT.

AD INFINI'TUM (*Lat.*), indefinitely, or to infinity.

AD LIB'ITUM (*Lat.*), at pleasure.

AD PON'DUS OM'NIUM (equal to the weight of all: *Lat.*), among Physicians, denotes, that the last-mentioned ingredient ought to weigh as much as all the before-mentioned ingredients, taken together.

AD VALO'REM (*Lat.*), in Commerce, according to the value.

ADA'GIO (slowly: *Ital.*), in Music, a degree quicker than *grave* time, but with graceful and elegant execution.

• **AD'AMANT** (*adamas*: from *a*, not; and *damao*, I conquer: *Gr.*, on account of its hardness), a name for the diamond.

AD'AMITES, in Church History, an ancient sect, which is said to have professed an exact imitation of the life of Adam and Eve in Paradise. It reappeared in Bohemia in the fifteenth century.

AD'DER, or common viper (*Vipera berus*), a native of England, where it grows about two feet in length. It is of a brownish colour, with a row of black spots along the back. Its bite is venomous, and the remedy for it is to rub the part with olive oil over a chafing dish of coals. It prefers dry places, and during winter lies torpid in a place of concealment. This reptile is viviparous.

ADDI'TION (*additio*, from *addo*, I add: *Lat.*), in a general sense, is the uniting or joining several things together; or it denotes something added to another.——In Arithmetic, the first of the four fundamental rules; that by which we collect several quantities into one total, or sum. When the numbers to be added consist of but one denomination, it is *simple* addition; when they consist of more than one, it is *compound*.——ADDITION, in Algebra, the uniting of two or more quantities, so as to form a more simple expression.——ADDITION, in Law, denotes all kinds of designations given to a man, over and above his proper name and surname, to show his estate, degree, profession, place of abode, &c.

ADDORS'ED (*ad*, to; and *dorsum*, the back: *Lat.*), a term in Heraldry, signifying back to back.

ADENOG'RAPHY, or **ADENOL'OGY** (*adēn*, a gland; and *grapho*, I write; or *logos*, a discourse: *Gr.*), that part of Anatomy which treats of the glands.

AD EUNDEM (to the same degree, understood: *Lat.*), a University phrase, employed when a graduate of one university is, as a matter of favour, admitted to the same degree in another.

ADHE'SION (*adhæreo*, I cling to: *Lat.*), the phenomenon by which the particles of bodies continue together. *Adhesion* denotes union between two bodies of different kinds; cohesion, union between two bodies of the same kind.——ADHESION in Botany, the growing together of parts, a common phenomenon in plants. The adhesion of the margins of petals produces a monopetalous corolla. The adhesion of the filaments of stamens makes them monodelphous, diadelphous, &c.——ADHESION, in Medicine, the junction of parts which ought to be separate.

ADIAN'TUM (*adiantos*, unwetted, hence dry: *Gr.*), in Botany, a genus of thin-leaved ferns, having the fructification at the ends of the lobes of the fronds, covered by the reflexed margin. *Adiantum Capillus Veneris*, *Maiden's Hair*, is an example.

AD'IPOCE'RE (*adeps*, fat; and *cera*, wax: *Lat.*), a substance, in some of its properties, resembling a mixture of fat and wax. It is produced by the decomposition of the flesh of animals in moist situations, or under water.

AD'IPOSE (*adeps*, solid fat: *Lat.*), in a general sense, denotes something belonging to the fat of the body. The term adipose is chiefly used by physicians and anatomists.——ADIPOSE MEMBRANE, the cellular membrane, in which the fat is deposited.——ADIPOSE FIN, the small rudimentary fin on the back of the salmon, trout, and fishes of the same family. It is usually placed over the anal fin, at a distance from the first dorsal.

AD'IT, OF A MINE (*aditus*, from *adeo*, I approach: *Lat.*), the horizontal aperture by which it is entered: it is distinguished from a *shaft*, which is vertical.

AD'JECTIVE (*adjectivus*, from *adjicio*, I place near: *Lat.*), in Grammar, a word expressing some quality, or other accident, of the substantive with which it is joined.

ADJOURN'MENT (*adjournement*: from *a*, to; and *jour*, a day: *Fr.*), the putting off a court or other meeting till another day. In parliament, adjournment differs from *prorogation*: the former is not only for a shorter time, but is also an act of the house itself, whereas the latter is an act of royal authority.

AD'JUNCT (*adjunctus*, from *adjungo*, I join to: *Lat.*), something joined to another.

AD'JUTANT (*adjuto*, I assist: *Lat.*), a military officer, who assists the commanding officer. When detachments are to be made, he gives the number to be furnished by each company or troop, and assigns the hour and place of rendezvous. He also places the guards, receives and distributes ammunition to the companies, &c.

AD'JUTANT-GEN'ERAL, a staff officer, who holds the same position with reference to the army as the adjutant to the regiment. He assists the commander-in-chief, and distributes his orders.

ADMINISTRA'TION (*administratio*, from *administro*, I manage: *Lat.*), the executive government of a country.——ADMINISTRATION, in Law, power granted by the Court of Probate to the person pointed out by the statutes as the manager of the personalty of one who dies intestate, which he is bound to distribute amongst the persons entitled under the statutes of distribution, except in the case of a husband administrator, who is entitled as of right to the administration and enjoyment of his deceased wife's estate. After debts are paid, one-third goes to the widow, and the rest, in equal portions, to the children; or, if they are dead, to their lineal descendants. If there be none of these, the widow receives a half, and the next of kin in an equal degree, and their representatives the remainder, or the whole, if there is no widow. Among collaterals, none more remote than the children of the intestate's brothers and sisters are admitted. Letters of administration are to be granted to the husband or his representatives, to the widow or next of kin; of persons related in an equal degree, the court may take its choice. The order of kindred is, with reference to the distribution of property, children, parents, brothers, grandfathers, uncles or nephews (and the females of each class respectively), cousins. Letters of administration, *de bonis non administratis*, are granted, when a previous administrator dies without completing the business. When a person makes a will without naming an executor, or names executors who refuse to act, the Court of Probate will grant administration *cum testamento annexo*, the duty of the administrator in this case being to carry out the will. The Court of Probate is governed by the same rules as the Ecclesiastical Court, which it superseded.

ADMINISTRA'TOR (*Lat.*, from same *deriv.*), in Law, the person to whom the estate and effects of an intestate are committed, for which he is to be accountable when required.

AD'MIRAL (*amiral: Fr.*), the commander of a fleet of ships of war, having two subordinate commanders, as vice-admiral and rear-admiral. Admirals are distinguished into three classes by the colour of their flags, as red, white, and blue. The *admiral* carries his flag at the main-top-mast head; the *vice-admiral* at the fore-top-mast head; and the *rear-admiral* at the mizen-top-mast head. The admiral has the same power over the maritime forces as the general over land forces.——The LORD HIGH ADMIRAL had the management of all maritime affairs, and the government of the royal navy. He was always a person of high rank. For a short time the office was filled by William IV. when duke of Clarence, after having been in abeyance just a century; during which period, as at present, the office was executed by a certain number of commissioners, called lords of the admiralty.

AD'MIRALTY, COURT OF, is a sovereign court, instituted by Edward III., and held by the judge of the admiralty; from whom there is an appeal to the sovereign in council. His office is to determine all manner of injuries upon the seas, or in parts out of the reach of common law. Murders, robberies, &c., committed at sea, are tried by the ordinary judges. The Court of Admiralty decides regarding prizes, &c.——VICE-ADMIRALTY COURTS, courts established in all the dependencies of Great Britain; they have cognizance of all cases of captured vessels, misdemeanours in merchant ships, &c.

ADMITTEN'DO IN SO'CIUM (admission of an associate: *Lat.*), a writ associating certain persons to the justices of assize already appointed.

ADNA'TA (*adnascor*, I grow upon: *Lat.*), in Anatomy, one of the tunics or coats of the eye, otherwise called *conjunctiva* and *albuginea*: it is the same with the white of the eye.

AD'NATE (same *deriv.*), in Botany, a term applied to an organ which is attached to another.

ADO'NIA, solemn feasts in honour of Venus, instituted in memory of her beloved Adonis, and observed with great solemnity by the Greeks, Phœnicians, Lycians, Syrians, Egyptians, &c. They lasted two days: on the first of these the women laid in the streets the images of Venus and Adonis, as if they were corpses, weeping, tearing their hair, beating their breasts, and using every token of grief; on the second, they sang his praises, and made rejoicings, as if Adonis had been raised to life again.

ADOP'TION (*adoptio: Lat.*), among the Greeks and Romans, the making a person one's heir, and investing him with all the rights and privileges of a son. In Rome, before adoption could take place, the natural father was obliged to renounce all authority over his son, and with great formality consent that he should be translated into the family of the adopter. The adoption of a person already free was called *adrogation*.

ADORA'TION (*adoratio*, from *adoro*, I worship: *Lat.*), a mode of reverence or worship anciently shown to the gods, by raising the right hand to the mouth, and gently applying it to the lips; also, in general, any outward sign of worship, by kissing the hand or feet, walking barefoot, or the like. Among the Jews, adoration consisted in kissing the hands, bowing, kneeling, and even prostration. But the posture of adoration most common in all ages and countries is kneeling.——ADORATION, a mode by which the cardinals, in conclave, sometimes elect the Roman pontiff. In *adoration*, unlike *scrutiny*, the cardinals rush hastily, as if by an internal impulse, to proclaim some one pope.

ADOSSE'E (*adosser*, to put back to back: *Fr.*), in Heraldry, two animals placed back to back. It also denotes any other figures, as axes, keys, &c., placed with their heads facing different ways.

ADULTERA'TION (*adulteratio*, from *adultero*, I corrupt: *Lat.*), in a general sense, denotes the act of debasing, by an improper mixture, something that was pure and genuine. Thus, adulteration of coin is the casting or making it of a metal inferior in goodness to the standard, by using too great a proportion of alloy. Putting inferior ingredients into bread, beer, wine, &c., by bakers, brewers, and other traders, for the purpose of imposing on the public, is also called adulteration, and cannot be too severely reprehended or punished: the consequences often proving fatal to the health, and always greatly abridging the comforts, of those who are the victims of such nefarious practices. An act of parliament authorizes the appointment of official *analysts* whose duty it is to examine articles of food or drink supposed to be adulterated.

ADUL'TERY (*adulterium: Lat.*), a violation of the nuptial bed; an offence which has been regarded by all civilized nations with abhorrence, and in ancient times was punished as a great crime. By the Jewish law the penalty was death, which was inflicted by stoning; though this mode of punishment has not been assigned to it in Deuteronomy. The Romans did not visit it with death until the reign of Constantine. The various countries of Europe have, at different times, punished it in different ways, and sometimes with great severity. In this country it is, at present, subject only to the cognizance of the Court of Probate and Divorce: which may grant a divorce on account of it, if the offending party be the wife. If the offender be the husband, the adultery must be accompanied with desertion for two years, cruelty, bigamy, or some infamous crime, before the wife has a right to a divorce. The court may also award damages, and appropriate all, or a part of them, to maintain the children or the wife.

ADVA'NCED-GUARD, or VAN'GUARD, in the Military art, the first line or division of an army, ranged or marching in order of battle.

ADVEN'TURE, BILL OF (*adventurus*, about to happen: *Lat.*), in Commerce, a writing signed by a merchant, to testify that the goods shipped on board a certain vessel belong to another person, he himself being answerable only for the produce.

AD'VERB (*adverbium*: from *ad*, to; and *verbum*, a verb: *Lat.*), a word so called from its connection with verbs; though it is also frequently joined with adjectives and other parts of speech, to modify their meaning.

AD'VOCATE (*advocatus*, from *advoco*, I summon: *Lat.*), a barrister; a pleader in civil or ecclesiastical causes. Advocates were held in great honour during the first ages of the Roman commonwealth, being patricians who defended their clients gratuitously; whence has arisen the custom among ourselves of regarding fees as honorary, and not recoverable by law. But, even before the subversion of the republic, the class had become a profession, though an honourable one. In the time of Cicero, an *advocate* did not mean the patronus, or him who made the speech; it did, however, in the time of the emperors. In almost every civilized country, men of the first talents are found among its advocates.——LORD ADVOCATE, the chief crown lawyer in Scotland, analogous to the attorney-general in England, and the public prosecutor. He exercises a superintending power over the general administration of criminal justice, and is, in point of fact, the secretary of state for Scotland. His powers are very extensive.

ADVOW'SON (*advocatio*, a calling to: *Lat.*), in Law, a right of presentation to a vacant church or benefice, and capable of being sold, like any other species of property, except during a vacancy. He who possesses this right is called the *patron* of the living. This right was first allowed to such as were founders, benefactors, or maintainers of the church. Advowsons are either *presentative*, as when the patron presents or offers his clerk to the bishop to be instituted; *collative*, as where the benefice is given by the bishop, as the original patron, or by means of the right he has acquired by lapse; or *donative*, as where the king, or other patron, by a simple donation in writing, puts the clerk into possession, without presentation, institution, or induction. If the patron (except in the case of an advowson donative) does not present a clerk within six months after the benefice becomes vacant, the presentation lapses to the bishop. In the case of benefices south of the Trent, the patronage of advowsons belonging to Roman Catholics is vested in the University of Oxford, and the University of Cambridge presents to those on the north of that river.

A'DY, the palm-tree of the island of St. Thomé, on the coast of Malabar; the fruit of which is of the size and shape of a lemon, and contains an aromatic kernel, from which an oil, answering the purpose of butter, is prepared.

AD'YTUM (*adutos*, not to be entered: *Gr.*), the most retired and secret place of the heathen temples, into which none but the priests were allowed to enter.

Æ'DES (a temple: *Lat.*; in the plural, *Ædes* signified a private residence), in Roman Antiquity, an inferior kind of temple, consecrated indeed to some deity, but not by the augurs. There were a number of these in ancient Rome: thus the *Ædes Fortunæ*, *Ædes Pacis*, *Ædes Herculis*, &c. The distinction between ædes and temple was ultimately lost.

ÆDI'LES (*ædes*, a temple: *Lat.*), four Roman magistrates, whose chief business was to superintend buildings of all kinds, but more especially public ones, as temples, aqueducts, bridges, &c.; and to take care of the highways, weights and measures, &c. The ÆDILES were distinguished into the *Ædiles plebeii*, who were chosen from the plebeians, as assistants to the tribunes; and the *Ædiles curules*, who were originally elected only from the patricians, to take charge of certain public games. Julius Cæsar added two plebeian ædiles, termed *cereales*, to inspect public stores of provisions.

Æ'GILOPS (*aigilōps*: from *aix*, a goat; and *ōps*, an eye: *Gr.*), an abscess in the canthus, or corner of the eye near the nose. Goats were supposed to be subject to a similar disease.——In Botany, a genus of grasses, of which several species grow in Europe.

ÆGIN'ETAN MA'RBLES, a collection of ancient sculptures preserved in the Glyptothek at Munich. They were originally placed on the pediments of a temple in the Grecian island Ægina, and represent the heroic actions of Hercules, Ajax, and others against the Trojans. They are anterior to the time of Phidias, and the style is archaic.

Æ'GIS (*aigis*, a shield: *Gr.*), the shield of Jupiter. It had the Medusa's head fixed upon it. The word is sometimes used to express the breastplate of a god. Artists, in representing the ægis, seem to have considered it as a goat's skin, and derived from *aix*, a goat.

ÆNE'ID, the title of Virgil's epic poem, in which he celebrates the adventures of Æneas, one of the bravest among the Trojan heroes, and who was feigned to be the son of Venus by Anchises. The author introduces him as sailing from Troy, after its destruction, in search of the shores of Italy, on which it had been promised by the gods that he should found an empire destined to be immortal. He is shipwrecked upon the coast of Africa, where he is hospitably received by Dido, queen of Carthage, to whom he relates his adventures, beginning with his escape from Troy, when it was taken by the Greeks. Dido falls in love with him, but he is bent on leaving Carthage, and she dies on a funeral pile. A storm drives him to Sicily, but at length he reaches the Italian coast. The Sybil of Cumæ then guides him down to the infernal regions, where he has an interview with his father, who informs him of the destiny reserved for his descendants. Returning to the upper world, Æneas is promised the daughter of king Latinus in marriage, but he has a rival in Turnus, king of the Rutuli, and war is carried on between them. In the end Æneas slays Turnus in single combat, and this terminates the poem. Elegance of language and good taste, not invention or soaring power, are the characteristics of the Æneid, to which Virgil, who died B.C. 19, did not live to put the finishing touches he intended.

ÆO'LIAN HARP (*Æolus*, God of the winds), a stringed instrument which is placed in a window, and played upon by the wind. It produces the effect of a distant choir of music in the air, sweetly mingling all the harmonic notes, and swelling or diminishing its sounds according to the strength or weakness of the blast.

ÆOL'IPILE (*æolipilæ:* from *Æolus*, god of the winds; and *pila*, a ball: *Lat.*), a hollow metal ball, in which is inserted a slender neck or pipe, from whence, after the vessel has been partly filled with water and heated, issues a powerful stream of vapour. It serves to show the convertibility of water into steam, and was known to the ancients.

Æ'RA, or E'RA (*Lat.*), a fixed historical period whence years are reckoned: as the 'building of Rome,' or the 'birth of Christ.' Era and epoch are to be distinguished. An *epoch* is the point of time at which an *era* commences. Different nations have adopted different eras; but Christians always reckon from the birth of Christ, which is generally thought to have taken place in the middle of the 4th year of the 194th Olympiad, and in the 753rd year of the building of Rome. Above are the principal eras.

Era	Commenced	Abbreviation
Year of the World—		
Constantinopolitan account . .	B.C. 5509	A.M. Const.
Alexandrian account	„ 5492	A.M. Alex.
Jewish account .	„ 3760	A.M.
Era of Nabonassar .	„ 747	Era Nab.
Olympiads	„ 776	Olymp.
Year of Rome . .	„ 753	A.U.C.
Julian Era	„ 45	Jul. Era.
Christian Era . . .		A.D.
Era of Sulwanah .	A.D. 78	Saca.
Era of Diocletian .	„ 284	Era Dios.
The Hegira . . .	„ 622	A.H.
Era of Yezdegird .	„ 632	A.Pers.

ÆRA'RIUM (a treasury, from *æs*, money: *Lat.*), in Roman Antiquity, the treasury, or place where the public money was deposited. The *ærarium sanctius*, or more sacred treasury, was intended to provide only for cases of extreme urgency.

AE'RIAL ROOTS. These are roots which some plants are in the habit of emitting above the ground. The processes by which the ivy clings to a wall are aerial roots. The lower part of the trunk of the SCREW PINE sends out a great number of such roots, which enter the ground and prop it all round. In India living bridges are formed across streams by taking advantage of the property possessed by some kinds of fig trees of sending out aerial roots, which are made to grow together and form natural grafts.

AERODYNAM'ICS (*aēr*, the air; and *dunamis*, power: *Gr.*), that branch of aerology which treats of the motion of the air, and its mechanical effects when in motion; also its resistance to bodies moving in it.

AE'ROLITES (*aēr*, the air; and *lithos*, a stone: *Gr.*), meteoric stones, which fall in a state of ignition from the atmosphere. Many different opinions have been held regarding the origin of these remarkable productions. Some have supposed them projected from volcanos in the moon, which is quite possible, since they would require, for this purpose, an initial velocity of only 7770 feet per second, or four times that of a ball when first thrown from a cannon with an ordinary charge of powder. Others have believed them ejected from terrestrial volcanos, with a force sufficient to carry them far above the atmosphere. They are now usually regarded as fragments thrown off from shooting stars and fire balls when, in moving with planetary velocities in space and revolving in conic sections round the sun, they approach the earth in their paths, and enter our atmosphere, becoming luminous therein. They are thrown with such force that they sometimes enter the soil to the depth of 15 or 20 feet. The largest stone that has been measured is 7½ feet long. These stones bear a general resemblance to each other in external form, in the nature of their crust, and in the chemical composition of their principal constituents. In all, 18 elementary substances have been found in them, including metallic iron, a metal which has never been found in this state in our globe. Much interest was attached in ancient times to an aerolite which fell in the 78th Olympiad, about the time of the birth of Socrates at Ægospotamos on the Hellespont. It is mentioned by several Greek and Latin writers.

AEROL'OGY (*aēr*, the air; and *logos*, a discourse: *Gr.*), the doctrine or science of air. [See AIR, ATMOSPHERE, and GAS.]

AEROM'ETRY (*aēr*, the air; and *metreo*, I measure: *Gr.*), the art of measuring the air, so as to ascertain its pressure or weight, its elasticity, rarefaction, &c.

A'ERONAUT (*aēr*, the air; and *nautēs*, a sailor: *Gr.*), one who sails in the air in a balloon.

AERONAU'TICS (last), or AEROSTA'TION (*aēr*, the air; and *istemi*, I stand: *Gr.*), the art of navigating the air, by employing air-balloons, or silken globes, filled with a gas lighter than atmospheric air, usually carburetted hydrogen, from its being easily procurable in large quantity.

ÆRU'GO (rust: *Lat.*), the rust of copper. The Romans considered that ærugo added greatly to the appearance of their bronze statues.

ÆSTHET'ICS (*aistheticos*, fitted to perception: *Gr.*), that branch of philosophy which investigates all questions relating to *the beautiful* in poetry and the fine arts.

ÆSTIVA'TION (*æstivus*, belonging to summer: *Lat.*), in Botany, the manner in which the parts of a flower are arranged before they unfold.

ÆTHER (*aithēr*, pure air: *Gr.*), a hypothetical subtle fluid, supposed by some to fill all space, and to be that substance the vibrations of which constitute light and heat, as the vibrations of the air constitute sound. Some astronomers think that certain irregularities in the motions of the planets are to be accounted for by the retarding property of an æther, and one of the explanations of the phenomena of terrestrial magnetism is founded upon the hypothesis of æther.

ÆTHOGEN (*aithōn*, glittering; and *ginomai*, I become: *Gr.*), a compound of boron and nitrogen, which yields a brilliant phosphorescent light, when heated before the blow-pipe.

ÆTIOL'OGY (*aitia*, a cause; and *logos*, a discourse: *Gr.*), the doctrine of the causes of disease.

AËTI'TES (*aetitēs*, from *aetos*, an eagle: *Gr.*), or EAGLE STONES, a name given to pebbles or stones of any kind, which have a loose nucleus rattling within them. Eagle stones are frequently found in our gravel pits. They obtained their name from being supposed to be used by the eagle in building its nest.

AFFETUO'SO (*affetto*, affection: *Ital.*), in Music, a term prefixed to a movement, to show that it is to be performed in a smooth, tender, and affecting manner, and somewhat slowly.

AFFI'ANCE (*fiancer*, to betroth: *Fr.*) denotes the mutual plighting of troth between a man and woman, to bind themselves to the performance of a marriage contract. It has no other effect in law than that, if a party who was of age at the time of making it violates it, there is a right to an action for damages.

AFFIDA'VIT (*affido*, I confirm by oath: *Lat.*), in Law, a written statement made on oath before one who is legally authorized to receive it. Voluntary affidavits are abolished, *declarations* being substituted, as also in many cases in which affidavits were formerly required.

AFFILIA'TION (*ad*, to; and *filius*, a son: *Lat.*), in Law, proof of paternity in the case of an illegitimate child, with the view of obliging the father to contribute to its support. Application must be made to a justice of peace within a year after the birth of the child, unless the father have already contributed to its support; and a summons will then be issued. The mother's oath must be corroborated by other evidence; and there is a right of appeal given to the reputed father.

AFFIN'ITY (*affinitas*, from *affinis*, related by marriage: *Lat.*), in Civil Law, the relationship in which each of the parties married stands to the kindred of the other. Affinity is distinguished into three kinds: 1. *Direct Affinity*, or that subsisting between the husband and his wife's relations by blood, or between the wife and her husband's relations by blood. 2. *Secondary affinity*, or that which subsists between the husband and his wife's relations by marriage. 3. *Collateral affinity*, or that which subsists between the husband and the relations of his wife's relations. It should, however, be observed, that a person cannot, by legal succession, receive an inheritance from a relation by affinity; neither does it extend to the nearest relations of husband and wife, so as to create a mutual relation between them.——AFFINITY, in Comparative Anatomy, the similarity between animals, arising from a resemblance between their organizations. [See HOMOLOGY.]——AFFINITY, in Chemistry, that attractive force which is assumed to exist when different substances combine, so as to form a compound having qualities very different from those of its elements. To enable substances to unite chemically, they must be placed in favourable circumstances:— two solids rarely unite; and even two fluids sometimes require heat, to overcome the cohesion of their particles. The solar rays frequently aid affinity. Substances unite more readily in their *nascent* state; that is, at the moment they are liberated from some compound. Bodies under the influence of chemical affinity never unite in *all* proportions. Some definite relative quantity of one, or some multiple of it, always combines with some definite relative quantity of any other with which it has an affinity, or some multiple of it; and the least known definite combining proportion of an element is termed its *chemical equivalent*, or *atomic weight*. Thus 6 is the equivalent of carbon, and 8 that of oxygen:—hence 6 grs., for example, of carbon, and 8 grs. of oxygen, form a compound (carbonic oxide); 6 grs. of carbon, and 16 grs. of oxygen, form another compound (carbonic acid); 12 grs. of carbon, and 24 grs. of oxygen, form another compound (oxalic acid). These three compounds, consisting of different quantities of the *same* elements, are extremely unlike in properties:—the first is a combustible; the second is harmless in the stomach; the third is a most violent poison. Again, 8, 16, 24, 32, and 40 lbs., grs., &c., of oxygen, unite with 14 lbs., grs., &c., of nitrogen: forming five totally different compounds. Thus we have enumerated several compounds containing oxygen; but all of them contain it, as some multiple of 8, its atomic weight, or chemical equivalent. And whatever substance we select for examination, we shall always find some multiple of its atomic weight in combination. The exceptions to this rule discovered in the organic kingdom are, undoubtedly, only apparent. The number which expresses how often the atomic weight is found in a compound is generally *small*. This is exemplified by the compounds of nitrogen mentioned above; the weights of the oxygen being, respectively, 1, 2, 3, 4, and 5 times its atomic weight. Lastly, gases combine in volumes; and the volume of the result bears a very simple relation to the volumes of the elements combined to form it.

AFFIRMA'TION (*affirmatio*, from *affirmo*, I assert positively: *Lat.*), a simple asseveration, which, according to a set form of words, is allowed to persons who have conscientious scruples to oaths. Under a special act of parliament declarations have in many cases been substituted for affidavits, without reference to individual opinion. A false affirmation, or a false declaration, is subject to the same penalties as perjury.

AFFIR'MATIVE (*affirmativus: Lat.*, same *deriv.*), an epithet applied by Logicians to propositions in which the copula is affirmative.

AF'FIX (*affixus*, joined to: *Lat.*), in Grammar, a particle added to the close of a word, to alter its signification; when placed at the beginning, it is a *prefix*.

AFFLA'TUS (an inspiration: *Lat.*), among heathen mythologists and poets, the actual inspiration of some divinity. Cicero, however, extends the meaning of the word farther, by attributing all great actions to a divine *afflatus*.

AFFRONTE'E (*affronter*, to face: *Fr.*), in Heraldry, an appellation given to animals facing each other.

AFLOAT', a term used to denote that a ship is in water sufficiently deep to buoy her up.

A FORTIO'RI (for a stronger reason: *Lat.*), a term implying that what follows is a more powerful argument than what has been before adduced.

AF'TERMATH, the grass which springs up after mowing.

A'GA (a commander: *Turk.*), a term applied, in courtesy, to a gentleman or wealthy landholder; or given on account of post or rank. The chief officers under the khan of Tartary are also called *Agas*.

AGALMAT'OLITE (*agalma*, an image; and *lithos*, a stone: *Gr.*), a soft mineral substance chiefly found in China, where it is wrought into various ornaments.

A'GAMOUS (*a*, not; and *gamos*, nuptials: *Gr.*), in Botany, a term sometimes applied to cryptogamic plants, on account of the supposed absence of bodies like stamens and pistils.

AG'APÆ (*agapē*, brotherly love: *Gr.*), love-feasts kept by the ancient Christians as a token of brotherly charity and mutual benevolence. In course of time abuses crept in, and rendered their abolition necessary.

AGAPE'TÆ (*agapētos*, beloved: *Gr.*), a society of unmarried women among the primitive Christians, who attended on and served the clergy. At first there was nothing improper in these societies: but they were afterwards charged with gross immoralities, and were wholly abolished by the council of Lateran, in 1139.

AGAR'ICUS (*agarikon*, a mushroom: *Gr.*), a large genus of fungi, including the common mushroom (*A. campestris*) and other species that are poisonous.

A'GATE (*achates: Gr.*), a stone much used, when cut and polished, for ornamental purposes. It is chiefly found in trap rocks, and consists of silex with a little oxide of iron. Chalcedony, onyx, cornelian, bloodstone, and jasper, are varieties of agate. Also a stone of the agate kind engraven by art, which constitutes, among antiquarians, a species of gem.

A'GAVE AMERICANA, the American Aloe does not belong to the same natural order as the true aloes, but to the *Amaryllidaceæ*. Several species inhabit America, some of which yield the pita fibre, or aloe thread: others a juice which, when fermented, forms a beverage called *pulque* by the Spaniards. The Agave presents a handsome appearance when in flower. A tall stem, like a flag-pole, rises from the middle of the plant, and the flowers are arranged candelabrum-fashion at the upper part. The plant dies after flowering. It is a mere fable that the Agave only flowers once in a hundred years.

AGE (*Fr.*), a certain period or limit of time, marked for the convenience of chronology and history by some remarkable events.—— Among ancient historians, the duration of the world was subdivided into three periods, or ages: the first, reaching from the creation to the deluge which happened in Greece during the reign of Ogyges, is called the obscure or uncertain age; the second, called the fabulous or heroic, terminates at the first Olympiad, the commencement of the third, or historical age. The poets also distinguished the period of the world into four ages; the *golden age*, or that of simplicity and happiness; the *silver age*, which was less pure than the golden age, and in which men began to till the ground for their sustenance; the *brazen age*, when strife and contentions commenced; and the *iron age*, when justice and honour had left the earth.——AGE, in Law, signifies certain periods of life, when persons of both sexes are considered competent to perform certain acts, which, for want of years and discretion, they were incapable of before: thus a man may take the oath of allegiance at twelve; at fourteen he is capable of contracting matrimony, and may be punished capitally for a crime; at twenty-one he can make valid contracts. A woman, at twelve, may contract marriage; and at twenty-one may enter into contracts which may be enforced against her. Both sexes are said to be of age, or to attain their majority, at twenty-one. Infants, under seven years old, are considered incapable of committing felony; between seven and fourteen they are acquitted, unless *malitia supplet ætatem*, that is, unless a propensity to crime makes up for want of age. In England persons are not admitted to deacon's orders until they are twenty-three years of age, nor to priest's orders until they are twenty-four. ——Among ancient Physiologists, the life of man was divided into six ages: *pueritia*, or childhood, extending from birth to five years old; *adolescentia*, or boyhood, to eight; *iuventus*, or youth, to thirty; *virilis ætas*, or manhood, to fifty; *senectus*, or old age, to sixty; and *decrepita ætas*, or decrepitude, to death.—By the Roman law, different ages were required for different purposes. Thus the consular age, or that at which a person might hold the consulship, was forty-three; the judiciary was between thirty and sixty; the military age was seventeen; the prætorian, forty.——AGE, in Literature, some period in which learning flourished to an unusual extent. It generally takes its name from a celebrated monarch, or some other illustrious person. The most remarkable ages are those of Pericles, the Augustan age, the age of Leo X., the age of Louis XIV., &c.——AGE, in Chronology, a century or a generation. The middle ages are generally considered to have begun with the reign of Constantine, and ended about the commencement of the sixteenth century. They ought to be considered as having ended with the invention of printing.

AGEN'DA (things to be done: *Lat.*), among Divines, sometimes signifies things which a man is bound to perform, in opposition to *credenda*, or those which he is bound to believe. It also denotes the service or offices of the church.

A'GENT (*agens*, doing: *Lat.*), in a general sense, denotes anything which acts, or produces an effect.——AGENT, *free* or *voluntary*, in Metaphysics, is he who may equally do anything, or its opposite, as acting not from any predetermination, but from choice.——AGENT is also used to denote a person entrusted with the management of an affair, whether belonging to a society, company, or private person. Thus there are *army agents*, through whom every regimental concern of a pecuniary nature is transacted; and *navy agents*, who are employed by naval officers and seamen to manage their concerns with regard to pay, prize-money, &c. ——AGENT, in Law, he who acts for and in the place of a principal. As long as he keeps within the scope of his authority, and declares that he is acting only as agent, he is not personally bound. A large body of law has grown up with reference to the relations of principal and agent.

AG'GREGATE (*aggrego*, I gather together: *Lat.*), in a general sense, the sum of several things added together, or the collection of them into one whole.

AGGREGA'TION (same *deriv.*), in Physics, a species of union, by which several things, which have no natural dependence or connection with each other, are collected together; thus, a heap of sand, or a mass of ruins, are bodies by aggregation.——In Chemistry, it means the adhesion of parts of the same kind; as pieces of sulphur united by fusion form an aggregate.

A'GIO (conveniency: *Ital.*), in Commerce, a term chiefly used in Holland and at Venice, to signify the difference between the value of standard and current money; also, the premium given when a payment is made in one metal instead of another—thus in gold instead of silver, where gold is scarce.

AGIST', AGIST'MENT, AGIST'AGE, or AGISTA'TION (*agister*, permission to receive cattle on land: *Old Fr.*), in Law, the taking in other people's cattle to graze, at so much per week. The term is applied also to the profits thence arising.

AG'MEN (*Lat.*, from *ago*, I set in motion), in the Roman art of war, an army, or rather a part of it, in march: thus the *Primum agmen*, or van-guard; the *Medium agmen*, or main body; and the *Postremum agmen*, or rear-guard.

AGNA'TION (*agnatio*, relationship on the father's side; from *agnascor*, I am born in addition to: *Lat.*), in Roman Law, the relationship subsisting between the descendants of the same man in the male line; in opposition to relationship through either males or females, termed *cognation*.

AGNOE'TÆ (*agnoeo*, I do not know: *Gr.*), in Church History, a sect of heretics, in the sixth century, who maintained that Christ, with respect to his human nature, was ignorant of many things, and particularly of the day of judgment.

AGNO'MEN (*ad*, to; and *gnomen*, the old form of *nomen*, a name: *Lat.*), in Roman Antiquity, the fourth or honorary name bestowed on account of some extraordinary action, virtue, or accomplishment. Thus the agnomen *Africanus* was given to Publius Cornelius Scipio, on account of his exploits in Africa.

AG'NUS DE'I (Lamb of God: *Lat.*), a prayer of the Roman Catholic liturgy, beginning with those words. Also, the figure of a lamb as symbolical of Christ. It is usually represented as bearing a staff headed with a Greek cross, or carrying a banner. This name is also given to a round piece of wax, on which is impressed the figure of the sacred Lamb, and which is consecrated by the pope with great solemnity. Such pieces of wax are consecrated every seven years, and distributed amongst the people.

AGO'NIA (*agōnia*, a contest: *Gr.*), among Physicians, a struggle between life and death.

AGONIS'TICUM (*agonistikos*, from *agonizomai*, I contend with: *Gr.*), in Medicine, an application of excessively cold water, in cases of fever.

AGOU'TI, the local name of the *Cavia Patagonica*, a rodent animal, which abounds on the wild plains of Patagonia. It weighs from 20 to 25 lbs. It hops like the hare and rabbit, to which it is allied, and like the latter it forms a burrow in the ground.

AGRA'RIAN LAWS (*agrarius*, belonging to land: *Lat.*), in Roman History, several measures regarding the distribution of the lands obtained by conquest, and which were at first leased out to the patricians at a very small rent, the plebeians gaining nothing by them. It is probable, says Michelet, that under the vague title of Agrarian law, two very different propositions have been confounded; first, that of permitting the plebeians to share the sacred territory of primitive Rome, to the possession of which all the rights of the city belonged. Second, that of sharing equally the lands conquered by the people and usurped by the patricians. An agrarian law was first heard of in connection with a half-mythical person, one Spurius Cassius, 484 B.C. The agrarian laws brought forward by Tiberius Gracchus cost him his life in 133 B.C.

AGREE'MENT (*agrément*, agreeableness: *Fr.*), in Law, the consent of two or more persons to anything done or to be done; a *contract*.

AG'RICULTURE (*agri cultura*, tillage of land: *Lat.*), the art of cultivating the ground for the purpose of obtaining vegetable produce therefrom. The system adopted at any given place should have reference to the soil and climate. The former, if of a tenacious nature, will require the application of surface draining for the purpose of withdrawing the water, which, if allowed to remain, might injure the crops; and subsoil draining, which has in view the carrying to the roots of the plants a supply of substances in solution such as are required for their support and growth. For the latter purpose artificial irrigation may be needed. A stiff soil ought to be lightened by the admixture of vegetable matter, road scrapings, &c.; a porous soil should be strengthened with stiffer materials, such as marl. All kinds of soil intended to receive seed require to be prepared by the operations of ploughing, harrowing, &c., and food ought to be supplied to the crops in the shape of some of the different kinds of manure. Some of these are yielded by the farm itself, such as the manure of cattle, and green crops which are ploughed into the soil. Others are prepared from bones, fish, &c.; others are chemical preparations from minerals, such as coprolites, and certain salts; whilst others, such as guano, are imported from foreign parts. The choice of a manure will depend upon the nature of the soil to which it is intended to be applied, and the crops intended to be grown. The mechanical operations of sowing and planting, of cutting, getting in, and storing the crops, are becoming daily more and more performed by machinery actuated on large farms by steam power. The breeding and feeding of cattle with a view to the market, or to the production of milk, butter and cheese, the breeding and feeding of sheep, either for food or for the sake of the wool, are usually but not necessarily, parts of an agriculturist's duties. Of late years agriculture has been much more successful in its results than formerly, because it has been pursued with the assistance of scientific men. Its various operations are rapidly becoming less empirical, and more uniformly conducted under the guidance of the truths of science.

AGROUND', a term applied to a ship, when any part of it rests on the ground, so as to render it immovable.

AGRYP'NIA (*agrupnia*: from *agr*, for *a*, not, and *hupnos*, sleep: *Gr.*), among Physicians, a privation of sleep, a troublesome symptom of nervous and febrile diseases.

A'GUE, a general name for all periodical fevers, which, according to the different times of the return of the feverish paroxysm or fit, are denominated quotidian, tertian, or quartan agues. They occur chiefly in situations where there are shallow, stagnant waters.

AHEAD', in Naval language, signifies farther on than the ship, in opposition to *astern*, or behind it.

A-HULL', a term for a ship when all her sails are furled, and she lies with her helm lashed on the lee-side.

AID (*aide*: *Fr.*), in feudal times, a subsidy paid by vassals to their lords, on certain occasions.

AID'E-DE-CAMP (assistant in camp: *Fr.*), an officer who attends on a general officer in the field, winter quarters, &c. A field-marshal is entitled to four; a lieutenant-general, to two; and a major-general, to one. The king appoints as many as he pleases, and the appointment gives the rank of colonel.

AIGUI'LLE (a needle: *Fr.*), an instrument used by engineers to pierce a rock for the lodgment of powder, as in a mine. The pointed rocks in Alpine mountains are termed Aiguilles.

AIL'ANTHUS, a deciduous tree, with pinnate leaves, introduced into England from China. It grows in the open air with us; and as its leaves afford food to a silkworm, the *Bombyx Cynthia*, it has been proposed to plant it extensively in our island, for the purpose of silk cultivation. It belongs to the natural order *Simarubaceæ*, and is, therefore, allied to the bitter Quassia.

AIR (*aër*: *Gr.*) [see ATMOSPHERE], in Grecian Mythology, was personified under the names of Jupiter and Juno. Jupiter was said to reign in the upper atmosphere, and Juno in the lower.——AIR, in Music, is properly the tune which is adapted to the words of a song, or piece of poetry intended to be sung; and, by the extension of the term, the song itself is called an *air*. In Operas, the name of *air* is given to all measured music, to distinguish it from the recitative; and, generally, to every piece of music, whether vocal or instrumental, which has its beginning and end. *Arietta* signifies a short, less elaborate air, designed to express a more simple and transient emotion.

AIR'-BLADDER, or the SWIM-BLADDER, an organ found in the abdomen of many fishes. It is considered to be homologous with the lungs of higher vertebrata, but its use seems to have relation to the equilibrium of the fish, and to lighten or increase its relative weight by its compression or dilatation. It is said that if the air-bladder is burst, or if it is pierced artificially, the fish remains at the bottom of the water, turning belly upwards. In freshwater fishes the contents of the sac have been found to be chiefly nitrogen.

AIR'-CELLS, in birds, membranous receptacles, communicating with the lungs, occupying the interspaces of the thoracic and abdominal viscera, extending round the principal joints, penetrating the substance of the bones, insinuating themselves between the skin and subjacent muscles, and entering the quills. The whole body being thus permeated by air, its specific gravity is diminished, and the organs of respiration are extended: an arrangement admirably calculated to adapt birds for flight.——**Air-Cells**, in plants, are cavities containing air, which in aquatic plants are large, and serve to float them.

AIR'-ENGINE, a machine somewhat analogous to the steam-engine, in which heated air is the motive power, instead of the vapour of water. Air is pumped into a cylinder, having been previously heated to 450°, by transmission through a series of wire nets, placed parallel and very close, in a vessel called a *regenerator:* when in the cylinder it is raised to 480°; and this increase of temperature doubles its volume. After having moved the piston, it leaves the cylinder, by means of valves; and passing through the regenerator, it gives back to it nearly all the heat it received. It escapes from the regenerator by that extremity at which the cold air is pumped in, and which therefore is cold, the other extremity being hot. The power of such an engine would be, the difference between that produced by increasing the elasticity of the air with heat, and that expended in working the pump which forces the air through. Its advantages would be, freedom from the danger of explosion, absence of a boiler and the necessity for water, and—theoretically at least—a more economical expenditure of heat. But, in practice, it is complicated, and has not been found to answer, particularly on a large scale.

AIR'-GUN, a gun constructed so as to propel bullets solely by means of condensed air, some of which is liberated at each discharge of the trigger.

AIR'-JACKET, a sort of jacket made of leather, in which are several bags or bladders, containing air. By the help of these bladders, which are placed near the breast, a person is supported in the water, without making the efforts used in swimming.

AIR'-PLANTS, or Epiphytes, are plants which are able to grow without attachment to the ground, deriving all the materials required for their growth from the atmosphere; the orchids of warm climates are examples.

AIR'-PUMP, a machine for exhausting the air out of vessels, in the same manner as water is drawn away by a pump. The operation of this machine depends on the elasticity of the air: for, by working the pump, the air in the receiver will expand itself; by which means part of it will be forced into the barrel of the pump, and be carried off. By thus continuing to work the pump, the air in the receiver will be gradually exhausted; but can never be wholly drawn out, so as to leave a perfect vacuum within the vessel; for it must be considered, that the air which is exhausted, is only pushed out by the spring of that which remains behind. In practice the machine will cease to act, when the air is so rarefied as to be unable by its elasticity to open the valves; though they are of extreme lightness, being generally formed of oiled silk.——**Air-Pump**, in steam-engines, is a pump worked by the engine for removing the air disengaged from the cold water in the condenser, and the water that collects at the bottom of that vessel.

AIR'-SHAFTS, in Mining, holes or shafts let down from the open air, to discharge the foul air or gases.

AIR'-THREADS, in Natural history, the long filaments seen floating in the air at the autumnal season of the year. [See Gossamer.]

AIR'-VESSELS; in insects, air-vessels, or *tracheæ*, scattered through all parts of their bodies, convey the air wherever it is required for renovating the fluids. They are frequently mounted as objects for the microscope.

AISLE (*ala*, a wing: *Lat.*), in Architecture, the side subdivisions of a church, generally separated from the nave by pillars or piers.

A'JUTAGE, or AD'JUTAGE (*adjuto*, I help: *Lat.*), in Hydraulics, a short pipe placed in a vessel to assist the discharge of a fluid.

AL, an Arabian particle, answering to the English *the*, as 'Alcoran,' *the* book.

A'LA, or A'LÆ (*Lat.*), in Ancient Military affairs, the wings of an army, or the horse on each side flanking the foot.——In Grecian Architecture, the colonnade surrounding the cella of a temple.——In Modern Architecture, the lateral buildings, subordinate to the centre or principal one.——**Ala**, in Ornithology, the wing of a bird.

AL'ABASTER (*alabastros: Gr.*), a well-known mineral composed of sulphate of lime, forming a soft, granular, imperfectly transparent marble; used for ornaments in houses, and by statuaries. It is found in Germany, France, Italy, &c.

ALA'BASTRUS (rose-bud: *Lat.*), a name occasionally given by botanists to the flower bud.

ALA'RAF (*arafa*, to distinguish: *Arab.*), according to the Mahometan creed, the party-wall which separates heaven from hell.

ALA'RES (belonging to a wing, from *ala*, a wing: *Lat.*), in Roman Antiquity, an epithet given to the cavalry, on account of their being placed in the two wings, or alæ, of the army.

ALAR'UM (*alarme*, fear: *Fr.*), any contrivance for the purpose of calling assistance in cases of sudden danger, generally a bell.

ALB, or ALBE (*albus*, white: *Lat.*), in the Roman Catholic Church, a vestment of white linen, hanging down to the feet. In the ancient church, it was usual with those newly baptized, to wear an alb, or white vestment; and hence the Sunday after Easter was called *dominica in albis*, on account of the albs worn by those baptized on Easter-day.

AL'BANIAN, a language of the Indo-European family, supposed to be the last surviving representative of the tongues which were spoken by the barbarous races living near and coexistent with the ancient Greeks.

AL'BATROSS, or Man-of-War Bird. This

belongs to the genus DIOMEDEA of naturalists, of which there are several species, all possessing a strong hard and thick beak with a curve at the end, webbed feet, and very long wings. The common albatross (*D. exulans*) is the largest known sea-bird, and is often met with in the neighbourhood of South Africa. Its plumage is white with black bands. It feeds on fish and is very voracious.

ALBIGEN'SES (from *Albigesium*, in the twelfth century the name of a place in France, now called *Albi*), a designation common to several sects who agreed in opposing the dominion of the Romish hierarchy, and endeavouring to restore the simplicity of primitive Christianity. They endured the severest persecutions, and after the middle of the thirteenth century, the name of Albigenses altogether disappeared; but fugitives of their party formed, in the mountains of Piedmont and in Lombardy, what is called the *French Church*, which not only existed till the era of the Reformation, but continues still to flourish.

ALBI'NO (*albus*, white: *Lat.*), or LEUCÆTHIOPS (*leukos*, white; and *Aithiops*, an Ethiopian; *Gr.*), a variety of the human species that frequently occurs in Africa. The Portuguese first gave the name of Albino to the white negro, whom they formerly described as belonging to a distinct race: but modern naturalists have discovered Albinos in various countries of Europe, viz. in Switzerland, among the Savoyards in the valley of Chamouni; in France, in the tract of the Rhine; in Tyrol, &c. Their characteristics are now said to be owing to a morbid state of the *rete mucosum*, which may attack men in every climate, and to which even certain animals are subject. Their skin has a dull white or cadaverous appearance; the iris of the eye is of a bright red; and the hair is either white and silky, or of a very flaxen colour. When this variety is found among the negroes, the woolly covering of their heads is white.

ALBU'GO (*albus*, white: *Lat.*), a disease of the eye, which consists of a white speck; and is called the *pearl*, &c.

AL'BUM (same *deriv.*), a white table or register, on which the Roman prætors had their decrees written. There were many others in use, and they received their appellations from the various magistrates whose names were entered in them; as the *album judicum*, the *album decurionum*, &c.——The ALBUMS of the present day are derived from the practice adopted in many foreign countries of having a white paper book, in which strangers of distinction or literary eminence were invited to insert their names, or any observation in prose or verse, as a memorial of their visit.

ALBU'MEN (the white of an egg: *Lat.*), a white or transparent viscous fluid, without taste or smell, which is a constituent of the nerves, the serous part of the blood, the white of eggs, milk, &c. The essential part is *albumin*, which is chiefly composed of carbon, oxygen, and nitrogen, with which a little hydrogen, sulphur, and phosphorus are combined. It is the sulphur which blackens a silver spoon when put into a boiled egg. Albumin coagulates with heat, and thus changed is insoluble in water, and frequently consisting of starch.——Also, a substance found in many seeds; it constitutes the flour of corn, &c. However poisonous a plant may be, its albumen is never deleterious.

ALBUR'NUM (sap-wood: *Lat.*), the soft white substance between the inner bark and the wood of exogenous trees.

ALCA'ICS, a term given to certain kinds of verse, from their inventor, the poet Alcæus. Of these verses Horace has given several examples of two:—1. Consisting of an iambus or spondee, an iambus, a long syllable, and two dactyls; 2. Two dactyls, and two trochees.

AL'CAIDE, or AL'CALDE, a Spanish or Portuguese magistrate, or officer of justice, answering nearly to the British justice of peace. Both the name and office are of Moorish origin.

AL'CHEMY, or AL'CHYMY (*al*, the: *Arab.*; and *chemia*, which is remotely derived from *cheo*, I pour: *Gr.*), that obsolete branch of Chemistry which had for its object the transmutation of metals into gold; and the finding of the *elixir vitæ*, or universal remedy. Though designing men have often used alchymy as a means of defrauding the credulous of their money, many have laboured in the fruitless search with indefatigable patience and purity of heart; and various discoveries of real value to science have been the accidental results of their labours.

AL'COHOL, a term of Arabic origin, signifying a spirit or essence, and originally applied to several chemical preparations. The word, at present, is used for a highly rectified spirit, the product of vinous fermentation. This is extremely light and inflammable: it is colourless and transparent, appearing to the eye like pure water. To the palate it is exceedingly hot and burning, but without any peculiar taste. When perfectly pure and free from water it is termed absolute alcohol, and it is then composed of carbon, hydrogen, and oxygen. The proof spirit of commerce has a specific gravity of 0·9198 at 60°F., and contains 49¼ per cent. of real alcohol. Under various forms it is largely employed in the arts, in the preparation of varnishes, &c. Its antiseptic power makes it also useful in preserving anatomical preparations. It has never been frozen.

AL'CORAN, or the KORAN (*al*, the; and *Koran*, a book: *Arab.*), the name of the volume containing the pretended revelations, doctrines, and precepts of Mahomet, in which his followers place implicit confidence. The general aim of the Alcoran was to unite the professors of the three different religions then followed in Arabia, Idolaters, Jews, and Christians, in the knowledge and worship of one God, under the sanction of certain laws, and by the use of ceremonies, partly of ancient, and partly of novel institution, enforced by the consideration of rewards and punishments, both temporal and eternal, and to bring all to the obedience of Mahomet, as the prophet and ambassador of God, who was to establish the true religion on earth. It was not until after Mahomet's death, which took place in 632 of our era, that his revelations were collected into a volume. They had been originally written on palm leaves and scraps of parchment. [See MAHOMETANISM].

ALCO'VE (*alcoba: Span.*; from *elcaut*, a sleeping chamber: *Arab.*), in Architecture, a recess intended for a bed, and often separated from the chamber by a balustrade. It was used sometimes by the Romans, at least as early as the Emperor Adrian.

ALCYO'NIUM, the scientific name of a genus of marine polypes to which the one popularly-known as 'Cow paps' or 'Dead man's fingers' belongs.

ALDEBA'RAN, a star of the first magnitude, vulgarly called the Bull's Eye, as making the eye of the constellation Taurus. It is the *α* Tauri of astronomers.

ALDE'HYDE (*alcohol dehydratus*, alcohol deprived of water: *Lat.*), a limpid colourless liquid, with a suffocating odour, obtained by passing the vapour of ether or alcohol through a red-hot tube, and by other methods. It is a compound of carbon, hydrogen, and oxygen.

AL'DER (*ellarn*, in *Ang.-Sax.*), a tree growing in damp places, the *Alnus glutinosa* of botanists, nat. order, *Betulaceæ*. The wood is of little value, except for charcoal.

AL'DERMAN (*ealderman*, older man: *Sax.*), a municipal officer, in a city or borough (see BOROUGH). In London their number is twenty-five, not including the lord mayor; each being elected by the freemen of a ward of the city, and having that ward committed to his more peculiar care, but serving by rotation as sitting magistrate for the whole. —— ALDERMAN, among our Saxon ancestors, was a name of dignity, at first unconnected with any office. It was afterwards the designation of him who was subsequently termed Eorl or *Earl*, and hence counties were sometimes called *Aldermanshires*.

AL'DINE EDITIONS, those editions of the Greek and Roman classics which were printed by the family of Aldus Manutius, first established at Venice about 1490.

ALE (*ælaw*, to inflame: *Sax.*), a fermented liquor, obtained from an infusion of malt and hops. *Pale ale* is brewed from slightly dried malt, and *brown* from malt highly dried.

A'LEA (a die: *Lat.*), in Antiquity, all kinds of games of chance; but used particularly for a game played with dice.

A-LEE', a sea-term, used when the wind, crossing or flanking the line of a ship's course, presses upon the masts and sails so as to make her incline to one side, which is called the lee-side: hence, when the helm is moved over to this side, it is said to be *a-lee*.

ALEM'BIC (*al*, the; and *ambecq*, corrupted from the Greek *ambix*, a cup: *Arab.*), a vessel formerly used for distilling, in the place of which retorts and stills are now most generally employed.

ALEXAN'DRIAN, or ALEXAN'DRINE, in Poetry, a kind of verse, consisting of twelve syllables, or six iambic feet. It is so called from a poem on the life of Alexander, written in this way, by some French poet, and is exemplified by Pope in the following lines:—

> 'A needless Alexandrine ends the song,
> Which, like a wounded snake, drags its
> slow length along.'

ALEXAN'DRIAN LIBRARY. This celebrated library was founded by Ptolemy Soter, for the use of an academy that he instituted in Alexandria; and, by continual additions under his successors, became at last the finest library in the world, containing no fewer than 700,000 volumes. To collect books for this library, all those which were brought into Egypt by Greeks or other foreigners were seized, and transcribed by persons appointed for that purpose: the copies were then delivered to the proprietors, and the originals laid up in the library. It was eventually burnt by order of the caliph Omar, A.D. 640. Omar argued thus: if these books agree with the Koran they are superfluous, and need not be preserved; if they disagree, they are pernicious, and ought to be destroyed.

ALEXAN'DRIAN MANUSCRIPT, or CODEX ALEXANDRINUS, a famous copy of the Scriptures, consisting of four volumes, in a large quarto size; which contains the whole Bible in Greek, including the Old and New Testaments, with the Apocrypha, and some smaller pieces, but not quite complete. This manuscript is now preserved in the British Museum. It was sent as a present to king Charles I., by Cyrillus Lucaris, patriarch of Constantinople, through Sir Thomas Rowe, ambassador from England to the grand seignior, about the year 1628. Its age and value have been the subject of much controversy. It was evidently not all written by the same hand.

ALEXI'PHARMICS (*alexo*, I repel; *pharmakon*, poison: *Gr.*), antidotes to poisons.

AL'GÆ (seaweed: *Lat.*), in Botany, a class of cellular flowerless plants with leaves and stems undistinguishable from each other, without proper roots and living entirely in water. They imbibe nutriment by their whole surface from the medium by which they are surrounded. SEAWEEDS, DIATOMS, and CONFERVÆ, belong to this class. A very curious fact connected with algæ is that some species produce particles which appear to have a voluntary motion as if they were minute animals. These are called spermatozoids. The motion is believed to be effected by means of vibratile cilia. As to the economical uses of the class, some gelatinous species contain a substance identical in its chemical formula with starch, and are employed as food (see NOSTOC). Iodine is obtained from seaweed, but soda is now otherwise procured. Some algæ have their tissues so stiffened with carbonate of lime that it was supposed they were corals, and one of the genera still bears the name of *Corallina*. Algæ are frequently of microscopic minuteness, occasionally they are of great size. Captain Cook says he met with seaweed that was quite 360 feet long. Beds of seaweed swarm with animal life to an extraordinary degree. [*See* SARGASSO SEA.]

AL'GAROTH (from Algarodi, an Italian, its discoverer), POWDER OF, a precipitate obtained by pouring water into the acidulous chloride of antimony.

AL'GEBRA (*al*, the; and *gebr*, resolution: *Arab.*), is a science the object of which is to abridge and generalize the resolution of all questions relating to quantities. Letters of the alphabet are employed to represent the quantities under investigation, and several of the signs of common operations are borrowed from arithmetic. Algebra, arithmetical and symbolical (says Mr. Cockle), is capable of division into three parts. The subject of identity might be made to constitute the first of these divisions; that of equality the second; and that of incongruity or absurdity the third. These divisions are of a purely theoretical character; practically speaking the subjects of them are treated indiscriminately as occasion requires. The assertion that *one is equal to one* is an identity; that x *is equal to one* is an equation; that *two is equal to one* an absurdity or contradiction. Whether they indicate identity, equality, or contradiction, these three species of proposition are all exhibited in algebra under the form of equations: thus

$$1 = 1; \quad x = 1; \quad 2 = 1;$$

but it is often a very difficult matter to determine whether what purports to be an equation, in the strict sense of the term, be really so, or whether it be not an identity or a contradiction. In one point of view, then, the whole of algebraic science may be said to be contained in the theory of equations. We may also regard the vast and illimitable field comprehended under this phrase as consisting of two great parts: the theory of *algebraic* equations, and the theory of *numerical* equations. In the former, accurate results are exclusively aimed at; and the algebraic theory may be defined as that which treats of the rigorous solution and transformation of equations, and the number and properties of their roots symbolically considered. The aim of the numerical theory is to ascertain the nature and limits of the roots of equations, and to arrive at values which shall enable us to satisfy equations either accurately or to any required degree of approximation. A literal equation (that is, one in which letters are made use of) may be treated either as an algebraic or a numerical one. In the latter case the letters stand for generalized numbers, and the processes applied to them are but universal types or examples of those which are to be employed when concrete are substituted for abstract numbers. It is only in their possible application to particular numerical instances that such processes are of any value whatever. On the other hand, a numerical equation (as we may call an equation with numerical coefficients) may be treated as an algebraical one, that is to say, by the algebraical theory. We may obtain rigorous expressions for its roots, ascertain their number, discuss their relations to the coefficients, or transform the equation itself by rigorous processes, and under exact forms as well when the coefficients are numbers as when they are symbols. [See MATHEMATICS.]

AL'GOL, a star in the constellation Perseus, the β Persei of astronomers, which, during a period of 2d. 20h. and 48m., changes from the second to the fourth magnitude, and then back to the second.

AL'GORITHM (an Arabic term), the art of computation, with reference to some particular subject, or in some peculiar way. Thus we say, 'the algorithm of numbers,' 'the algorithm of the differential calculus.'

AL'GUAZIL, the title of one of the lower orders of Spanish officers of justice, whose business is to execute the commands of the magistrate.

A'LIAS (otherwise: *Lat.*), in Law, a word often used in describing the accused, who has assumed other names besides his real one.

AL'IBI (elsewhere: *Lat.*), an expression employed when an accused person attempts to prove his innocence by showing that he was in another place when the act was committed.

A'LIEN (*alienus: Lat.*), in Law, a person born in a foreign country, unless his father, or grandfather on the father's side, were a natural born subject; in which case, though born abroad, he is considered a denizen; the term is used in opposition to natural subject. An alien is incapable of inheriting, or purchasing, or holding lands in England. But a child born out of the British dominions of a mother being a natural born subject, may inherit, purchase, or hold land; and all aliens subject of a friendly state may take a lease of houses or land for the purpose of residence or trade for a term not exceeding twenty-one years. No alien can become a member of parliament, of the privy council, or of any municipal corporation. An alien, guilty of a felony or misdemeanour, may elect to be tried by a jury composed of an equal number of denizens and aliens. [See NATURALIZATION].

ALIENA'TION (*alienatio*, from *alieno*, I make over to another: *Lat.*), in Law, the act of transferring the property and possession of lands, tenements, or other things, from one man to another: it is termed also *conveyance*. To alienate in fee, is to sell the fee simple of any land, or other incorporeal right.

ALI'GNMENT (*Fr.:* from *ad*, to; and *linea*, a line: *Lat.*), in Warfare, the state of being formed into a line, and the line so formed.

AL'IMENT (*alimentum, from alo,* I nourish: *Lat.*), whatever serves as nutriment to animal life.

ALIMEN'TARY (*alimentarius*, from same *deriv.*), in a general sense, is a term applied to whatever belongs to aliment or food.
——ALIMENTARY DUCT, or CANAL, a name given to the stomach and intestines, on account of the food passing through them. Sometimes it is a simple cavity, with but one opening; sometimes a canal with a vent distinct from the mouth; sometimes it is divided into four bags, as in the ruminants, or into seven, as in the bottle-nosed

whale.——ALIMENTARY LAW, among the Romans, that law by which children were obliged to maintain their aged parents.

AL'IMONY (*alimonia*, from same *deriv.*), in Law, an allowance which the English Court of Divorce and Matrimonial Causes directs to be paid to a wife when cohabitation has ceased. Alimony may be awarded either during the progress of a suit for divorce or judicial separation (alimony *pendente lite*), or it may be given after a decree for judicial separation has been pronounced.

AL'IQUANT PARTS (*aliquanto*, in some degree: *Lat.*), such parts of a number as will not divide or measure it exactly: as 7, the aliquant part of 16.

AL'IQUOT PARTS (*aliquot*, a certain number of: *Lat.*), such parts of a number as will divide or measure it exactly: as 2, the aliquot part of 4, 3 of 9, and 4 of 16. *Prime* aliquot parts are those which are prime numbers: *composite* aliquot parts, those formed by multiplying the prime together.

AL'KAHEST (*Arab.*), a universal menstruum possessing, according to the Alchemists, the virtue of pervading every substance, and capable of resolving all bodies into their *ens primum*, or first matter.

AL'KALI (*al*, the; and *kali*, the name of a plant: *Arab.*), in Chemistry, a term originally applied to the ashes of plants, but now used to designate potash, soda, and ammonia. The alkalis neutralize and form salts with acids, redden some vegetable yellows, and change some vegetable blues to green.

ALKALIM'ETER (*alkali*; and *metron*, a measure: *Gr.*), in Chemistry, an instrument for measuring the quantity of alkali, or alkaline carbonates, contained in the potash or soda of commerce.

AL'KALOIDS (*alkali*; and *eidos*, form: *Gr.*), substances analogous to alkaline bases, of vegetable origin, and possessed of great medicinal activity. Their ultimate elements are carbon, oxygen, hydrogen, and nitrogen. Quinine, obtained from various species of cinchona, conine from hemlock, and morphia from opium, are examples.

AL'KANET, the *Anchusa tinctoria* of botanists (nat. order, *Boraginaceæ*), a plant of which the root affords a reddish brown substance used by dyers. It is chiefly imported from the Levant.

AL'LAH, the Arabian name of God, as opposed to the deities of the idolators.

ALLE'GIANCE (*alligo*, I bind to: *Lat.*), in Law, the faithful obedience which every subject owes to his prince; being the tie or bond of fidelity which binds the governed to the governor. Every official person is required to take an oath of allegiance before he enters on his duties.

AL'LEGORY (*allēgoria*: from *allo*, another thing; and *agoreuo*, I declare: *Gr.*), in Literature, a figurative representation, which signifies something beyond the ordinary or apparent meaning. It may be addressed to either the eye or the ear. An *allegorical tale*, or *allegory*, is one in which abstract ideas are personified: thus, in many fables. A whole poem may be an allegory, as Spenser's 'Faery Queen;' or an entire narrative, as Bunyan's 'Pilgrim's Progress.' A parable is a short allegory. Allegorical interpretation becomes necessary when there is some difficulty or absurdity in the literal and obvious sense.

ALLE'GRO (merry: *Ital.*), in Music, denotes that the part is to be played in a brisk and sprightly manner. The usual distinctions succeed each other in the following order: *grave*, *adagio*, *largo*, *vivace*, *allegro*, *presto*. Allegro time may be heightened, as *allegro assai* and *allegrissimo*, very lively; or lessened, as *allegretto* or *poco allegro*, a little lively. *Più allegro* is a direction to play or sing a little quicker.

ALL-HAL'LOWS, an old English name for *All-Saints*, a festival in commemoration of the saints in general. It is kept on the 1st of November, Boniface IV. having in 835 appointed that day for its celebration: the saints having become so numerous that a day could not be allotted to each.

ALLI'ANCE (*allier*, to unite with: *Fr.*), in the Civil and Canon law, the relation contracted between two persons or two families by marriage.——ALLIANCE is also used for a treaty entered into by sovereign princes and states, for their mutual safety and defence.

ALLIGA'TION (*alligatio*, from *alligo*, I bind to: *Lat.*), a rule in Arithmetic, teaching how to compound several ingredients for any design proposed. It is either *medial* or *alternate*. The former shows the rate or price of any mixture, when its several quantities and their rates are known; the latter is the method of finding the quantities of ingredients necessary to form a compound of a given rate.

AL'LIGATOR (from a North American Indian word), a crocodilian genus inhabiting America. Their feet are not webbed like those of the true crocodiles. The *alligator lucius* haunts the Mississippi, and sometimes grows to the length of eighteen feet: it is protected by a dense covering of horny scales, impenetrable, in most parts, to a musket-ball.

ALLITERA'TION (*ad*, to; and *litera*, a letter: *Lat.*), a figure or embellishment of speech, which consists in the repetition of the same consonants, or syllables of the same sound, in one sentence. The Greek and Roman literature afford many instances of this; and in English poetry there are also many beautiful specimens of alliteration; though it must be confessed that it is too often used without the requisite skill, and carried too far. In burlesque poetry it is frequently used with excellent effect.

ALLOCU'TION (*allocutio*: *Lat.*), in Roman Antiquity, an harangue made by generals to their armies, in order to rouse their courage before a battle.——Also, in the Roman Catholic Church, an address made by the pope, on important occasions, to the cardinals and others.

ALLO'DIAL LANDS are those which, under the feudal system, were free. Their owners owed no service to a superior lord. 'Allodial lands,' says Hallam, 'are commonly opposed to beneficiary or feudal; the former being strictly proprietary, while the latter depended upon a superior. In this sense the word is of continual recurrence in ancient histories, laws, and instruments. It sometimes, however, bears the sense of inheritance.'

ALLO'PATHY (*allopatheia*: from *allos*, another; and *pathos*, suffering: *Gr.*), a term recently introduced to describe the ordinary course of medical practice in contradistinction to *Homœopathy*. The difference consists in the allopathists prescribing substances which, of their own nature, are calculated to *remove* symptoms like those of the disease to be cured; while the homœopathists employ medicines which, in the normal state of the patient, are calculated to *produce* these symptoms.

ALLO'PHANE (*allophanes*, appearing otherwise: *Gr.*), a luminous earth, of a blue, and sometimes of a green or brown colour, which occurs massive, or crystalline.

ALLO'TROPIC (*allos*, another; *tropos*, mode or position: *Gr.*), a term applied by chemists to bodies when possessing a form, different from their ordinary one, with the same essential chemical qualities. Thus, ordinary white phosphorus may, by the application of heat, be converted into a hard red amorphous substance, which is its allotropic form. It is theoretically assumed that the particles of the body are in different states of molecular equilibrium in the two forms.

ALLOY' (*alloyer*, to mix one metal with another: *Fr.*), a compound of any two or more metals (mercury not being one): thus, bronze is an alloy of copper and tin; brass, an alloy of copper and zinc, &c. The alloys are not mere mixtures, but true chemical compounds.

ALL'SPICE, so called from its compound flavour, is the dried immature berry of several species of *Eugenia* (nat. ord. *Myrtaceæ*), particularly *E. acris* and *E. pimento*, or Jamaica pepper.

ALLU'VION (*alluvius*, from *alluo*, I wash against: *Lat.*), in Law, a gradual increase of land along the sea-shore, or on the banks of rivers. This, when slow and imperceptible, is deemed a lawful means of acquisition; but when a considerable portion of land is torn away at once, by the violence of the current, and joined to a neighbouring estate, it may be claimed again by the former owner.

ALLU'VIUM (same *deriv.*), in Geology, deposits of gravel, sand, and mud, resembling those of a river's bed, or those left upon low lands by a flood, which are frequently found upon the surface of the earth under the vegetable mould. Alluvium is to be met with in all latitudes, from the equator to the polar regions. The greater part of it consists of transported materials. Rivers, or the sea, have been the means of removal. That form of it which has been called *diluvium*, or drift, or the boulder formation, is thought to have been transported by glaciers or floating ice.

ALMACAN'TAR (*almocantharat*: *Arab.*), a term used by the old astronomers, to indicate a small circle of the sphere parallel to the horizon.——ALMACANTAR'S STAFF is an instrument for observing, at sea, the sun's amplitude rising and setting.

AL'MAGEST (the greatest work: *Arab.*), the name of a celebrated book, composed by Ptolemy; being a collection of many of the observations and problems of the ancients, relating both to Geometry and Astronomy.

AL'MA MA'TER (kind mother: *Lat.*), a title given to a university by those who are, or have been, members thereof.

AL'MANAC (*Arab.*), a calendar or table, containing a list of the months, weeks, and days of the year, with an account of the rising and setting of the sun, the moon's age, the solar and lunar eclipses, the ecclesiastical feasts and fasts, the most remarkable phenomena of the heavenly bodies, and other incidental matters. The first printed almanac appeared in 1474; it was drawn up by Regiomontanus, in nearly the form now used.——The NAUTICAL ALMANAC, a most valuable work for mariners, is published in England two or three years in advance. It was commenced in 1767, by Dr. Maskelyne, the astronomer-royal, and has been regularly continued ever since.

AL'MONER (*aumonier*: *Fr.*), a functionary, usually an ecclesiastic, appointed by the crown, with the title of Lord High Almoner, for the distribution of the royal alms twice a year to as many poor men and women as the sovereign's age amounts to in years. Silver pennies are specially coined for distribution on Maunday Thursday, each person receiving a number equal to the years of the sovereign's age.

ALMS (*aumone*: *Fr.*), a general term for what is given out of charity to the poor. In the early ages of Christianity the alms of the charitable were divided into four parts, one of which was allotted to the bishop, another to the priests, and a third to the deacons and sub-deacons, which made their whole subsistence; the fourth part was employed in relieving the poor, and in repairing the churches.

AL'OE (*aloë*: *Gr.*; *alloch*: *Arab.*), a genus of liliaceous plants, several species of which yield the well-known drug so useful as a purgative. The aloes have fleshy leaves, with a juice of intense bitterness. Specimens are to be seen in every hothouse. The plants called *Yucca*, or Adam's Needle, and *Phormium tenax*, or New Zealand Flax, belong to allied genera.—The American aloe is an AGAVE, and falls into another order.

AL'OES-WOOD, or Eagle-Wood, is the produce of trees belonging to the genus *Aquilaria* (nat. ord. *Aquilariaceæ*), growing in the tropical parts of Asia. A fragrant oily or resinous substance, called in India uggur oil, is extracted from the wood which is sometimes used in medicine.

ALOE'TICS, a general term for all medicines, the basis or principal ingredient of which is aloes. The latter stimulates the larger intestines.

ALOGOTROPH'IA (*alogos*, out of proportion; and *trophē*, nourishment: *Gr.*), in Medicine, unequal growth or nutrition in different parts of the body.

ALOPE'CIA (*alōpekia*, a shedding of the hair—literally, the mange in foxes: *Gr.*), in Medicine, a falling off of the hair, occasioned either by a defect of nourishment, or by a bad state of the body.

AL'PACA, the *Auchenia alpaca* of naturalists, is a ruminant animal of the camel tribe, but distinguished from the true camels by having disjoined movable toes. It inhabits the mountain districts of Peru and Bolivia. Its long silky hair wool has been of late years extensively imported for manufacturing purposes. The Llama, the Guanaco, and the Vicuna are three other species of the same genus, natives of South America. The wool of the two former is coarse, that of the last downy.

AL'PHABET (*alpha*, *beta*, the two first Greek letters), the natural or customary series of the several letters of a language. The earliest kind of writing was, undoubtedly, the representation of what was to be told, by a kind of painting; the Greek word *graphein* means either to *paint* or to *write*. This mode of writing was used very early in Egypt, and gave rise, no doubt, to the invention of hieroglyphics: being probably adopted by other ancient nations also. It was employed by the Mexicans to convey to Montezuma information of the landing of the Spaniards. Syllabic writing must next have been devised, in which the different sounds, or syllables, were expressed; a word by this method would have as many characters as syllables. Such writing, though a great improvement, was still very inconvenient. At length, syllables were decomposed into their elements, a few simple sounds; and the representation of these constituted an alphabet. It is now supposed that the hieroglyphics of the Egyptians, which originally denoted objects, were ultimately employed to express sounds; and, from being *ideographic*, became not merely syllabic, but *alphabetical*. The Greeks believed that the Phœnicians were the inventors of letters; but there is reason to suppose that the Hebrew characters are older than the Phœnician, and were known in the time of Moses. The most ancient Greek, like the oriental languages, was written from left to right: it was afterwards written in alternate lines, from left to right and from right to left. It has been proposed to adopt a universal alphabet, which might contain a smaller number of elementary sounds than any used at present.

ALPHON'SINE TABLES, astronomical tables made in the reign of Alphonsus X., king of Arragon, who was a great lover of science, and a prince of rare attainments; but though these tables bear his name, they were chiefly drawn up by Isaac Hazan, a learned Jewish rabbi.

ALT (*altus*, high: *Lat.*), in Music, the high notes of the scale.

AL'TAIR, a star of the first magnitude in the constellation of the Eagle; it is the α Aquilæ of astronomers.

AL'TAR (according to some, from *alta ara*, high altar: *Lat.*;—according to others, from *Al*, God; and *tar*, appointed: *Heb.*), a place upon which sacrifices were anciently offered to the deity. There was probably a difference between the *ara* and *altare*, the latter being raised on a substruction; and they may have been employed in different circumstances. Before temples were in use, altars were erected sometimes in groves, sometimes in the highways, and sometimes on the tops of mountains; and it was a custom to engrave upon them the name, proper ensign, or character of the deity to whom they were consecrated. In the great temples of ancient Rome, there were ordinarily three altars; the first was placed in the sanctuary, at the foot of the statue of the divinity, upon which incense was burnt and libations offered; the second was before the gate of the temple, and upon it they sacrificed the victims; and the third was a portable altar, upon which were placed the offerings and the sacred vessels. These altars were of various heights, sizes, and materials; some yet remaining are beautifully decorated with *bassi relievi*. The principal altars of the Jews were those of *incense*, of *burnt-offerings*, and the *altar*, or *table*, for the *shew-bread*.

AL'TERATIVES (*alter*, the other: *Lat.*), such medicines as induce a favourable change in the system, without any manifest operation or evacuation.

AL'TERNATION OF GENERATION, a mode of reproduction amongst some of the lower animals, in which the perfect animal produces a different form, which may be termed larval, and this will for some generations produce similar or again different forms, the last of them producing the perfect form. Thus a Medusa will produce a larva which grows into the form of a sea-anemone, and this will go on for some time, throwing off similar animals by budding, until at length one of them will produce a Medusa of the original form.

ALTHÆ'A (*althaia*, marsh mallow: *Gr.*), marsh mallow, the *Althæa officinalis* of botanists, nat. order *Malvaceæ*, a plant, the root of which abounds with a mild mucilage, and is of great efficacy in medicine as an emollient. The hollyhock belongs to the same genus.

ALTIM'ETRY (*altus*, high: *Lat.*; and *metreo*, I measure: *Gr.*), the art of taking heights by means of instruments: and founded on the principle that the corresponding sides of triangles, having equal angles, are in exact proportion to one another.

AL'TITUDE (*altitudo*, height: *Lat.*), the height of an object, or its elevation above that plane to which the base is referred; thus, in Mathematics, the altitude of a figure is the perpendicular or nearest distance of its vertex from the base. The altitude of an object is the elevation of an object above the plane of the horizon; or the length of a perpendicular let fall to that plane.——ACCESSIBLE ALTITUDE of an object is that to whose base there is access, to measure the nearest distance to it on the ground from any place.——INACCESSIBLE ALTITUDE of an object is that to whose base there is not free access, by which a distance may be measured to it, on account of some impediment, such as water, wood, or the like. The instruments most generally used in measuring altitudes are the quadrant, sextant, theodolite, &c.——ALTITUDE OF THE EYE, in Perspective, the perpendicular height of the eye above the geometrical plane.——ALTITUDE OF A STAR, &c., in Astronomy, the height of any star, &c., above the horizon, or an arc of a vertical circle, intercepted between the star and the horizon. This altitude is either true or apparent, according as it is reckoned from the rational or sensible horizon: and the difference between these two is termed by astronomers the *Parallax of Altitude.*——ALTITUDES OF MOUNTAINS. [See HYPSOMETRY.]

AL'TO (*Ital.*), in Music, the *counter-tenor* part, or that immediately below the *treble.* It also indicates the tenor violin.

AL'TO RELIE'VO (high relief: *Ital.*), in Sculpture, a representation of figures and other objects against a flat surface; it differs from *mezzo relievo,* and *basso relievo,* only by the greater projection, or higher relief, of the figures.

AL'UM (*alumen: Lat.*), a salt consisting of alumina, potash, and sulphuric acid, with, in its ordinary form, water of crystallization. Its solution has a sweet and astringent taste. It is consumed largely in the arts, being employed by the dyer as a *mordant,* also by the tanner. Sulphate of alumina also combines with the sulphates of soda and ammonia, and these are also termed alums. There are several processes for the manufacture of alums. The old process of roasting alum shale is employed at Whitby and in Scotland. The shale of the coal measures is used at other places. Sulphate of alumina, obtained by boiling clay in sulphuric acid; and aluminate of soda, have also been employed for several of the purposes for which common alum is used.——ALUM STONE, a mineral, of a greyish or yellowish-white colour. It is found at Tolfa, in Italy, and in Bohemia; and yields a very pure alum, by simply subjecting it to roasting and lixiviation.

ALU'MINA (same *deriv.*), the oxide of aluminium, an earth which is the basis of alum, clay, basalt, slate, &c. It is of the greatest importance to mankind, for it enters largely into the composition of the best arable land, and is the chief constituent of all earthenware and porcelain.

ALU'MINITE (same *deriv.*), a mineral of a snow-white colour, dull, and opaque; the native sulphate of alumina.

ALU'MINIUM (same *deriv.*), a metal of which the earth alumina, the chief constituent of clay, is an oxide. It is only of late years that chemists have succeeded in inventing a process for extracting it in sufficient quantities and sufficiently cheap to enable it to be used for manufacturing purposes. It has a white colour somewhat resembling tin; its specific gravity is only 2·6 (about that of common glass), and hence it is frequently used in the construction of articles where lightness is an object. The melting point is much below that of silver. When heated in oxygen it burns with brilliancy and produces alumina. It is not affected by sulphuretted hydrogen like silver. From its sonorousness it will probably be employed in the construction of musical instruments. With from 92½ to 95 per cent. of copper it forms an alloy named aluminium-bronze, which is scarcely distinguishable by the eye from gold, whilst it is nearly as hard as iron. This alloy is coming into use in the manufacture of ornamental articles.

ALVEA'RIUM (*alveus,* a hollow place: *Lat.*), among Anatomists, the hollow of the auricle, or outer ear.

AL'VEOLATE (*alveolatus,* hollowed: *Lat.*), in Botany, an epithet applied to the *receptacle* of composite plants (the disk upon which the florets are placed), when it is divided into cells like a honeycomb.

ALVE'OLUS (a *diminutive* of *alveus,* a small cavity), in Natural History, properly denotes one of those waxen cells of which the combs in beehives consist.——ALVEOLUS, in Anatomy, the socket-like cavity in the jaws, in which each of the teeth is fixed.

AMA'DIS DE GAUL, the most celebrated of the romances of chivalry, written in Spanish by a Portuguese named Vasco Lobeira, who died in 1325. It relates the fabulous adventures of Amadis and other knights; the fairy mythology of the east is introduced, with monsters and marvels of every kind.

A'MADOU, or GERMAN TINDER, a fungus (a species of *Polyporus*) found chiefly on old oaks and ash trees. It is boiled in water, dried, beaten, soaked in a solution of nitre, and again dried for use.

AMAL'GAM, the combination of mercury with some other metal. Amalgams are used either to render a metal fit to be spread out, as in gilding, or else to reduce it to powder. Two methods are generally employed in making amalgams. The first is merely trituration in a mortar, and without heat: the second is fusing the metal which is to be amalgamated, and adding to it, when fused, the intended quantity of mercury. An amalgam of tin and mercury is used for looking-glasses. Medallists consider any soft alloy as an amalgam. The extraction of particles of gold from sand or stamped rock is usually effected by means of mercury. The mercury is afterwards vaporised by heat, and then condensed for future use.

A'MARANTH (*amarantos:* from *a,* not; and *maraino,* I wither: *Gr.*), a plant of fable and poetry, feigned to have flowers that never withered, and therefore made into garlands by the blessed. Botanists have given the name of *Amaranthus* to a genus of plants, nat. ord. *Amaranthaceæ,* which includes the well-known prince's feather, cock's-comb, and love-lies-bleeding.

AMARYL'LIS (*amarusso,* I sparkle: *Gr.*), a genus of bulbous rooted plants, with handsome flowers, belonging to the nat. ord. *Amaryllidaceæ.* They are natives of America, the West Indies, and the Cape of Good Hope, but most of our hothouse plants are hybrids. *Snowdrops* belong to the same order.

A'MATEUR (*amator,* a lover: *Lat.*), a person having a taste for a particular art, yet not professing nor being dependent on it.

AMAURO'SIS (*amauros,* dark: *Gr.*), among Physicians, a disease of the eye, called also the *gutta serena.* It arises, not from any external injury, but from a defective action of the nerve.

A'MAZONS (usually derived from *a*, without: and *mazos*, a breast: *Gr.*), a nation of female warriors, who are said to have founded an empire in Asia Minor. According to tradition, they permitted no males to reside among them, but had intercourse with the men of the neighbouring nations merely for the sake of preserving their community. Their male children they either killed or sent back to their fathers, but they brought up the females to war. They are said to have destroyed the right breast, that this part of the body might not impede them in the use of the bow: and it was from this supposed practice that they obtained the name of Amazons. The last account we have of them dates about 330 years before Christ, when it is related that their queen, Thalestris, made a visit to Alexander of Macedon, at the head of 300 of her Amazons.——The old geographers gave the name of **AMAZONIA** to a large tract of country in the interior of South America, because Orellana, the first discoverer of the country, asserts, that as he sailed up the stupendous river Maranon, or Amazon, he found on its banks a nation of armed women, who made war on the neighbouring people.

AMBAS'SADOR (*ambasciare*, to solicit: *Ital.*,—perhaps because originally sent to ask favours), the representative of one sovereign power to another, to which he is sent properly accredited. Ambassadors are the highest order of foreign ministers, and are either ordinary or extraordinary. An *ordinary* ambassador resides permanently at the foreign court to which he is accredited, and his duties consist in acting as the medium of intercourse between his own court and that to which he is accredited, and in transmitting such intelligence as is likely to interest his own court. *Ambassadors extraordinary* are sent on some important occasion, and are generally surrounded with great pomp and splendour; but they leave the country as soon as the affair is despatched. The persons of ambassadors are sacred, both in peace and war; so that, according to the law of nations, if hostilities break out between two nations, the respective ambassadors are permitted to depart without molestation. By the laws of England, an ambassador is amenable only for crimes which are contrary to the laws of all nations: when guilty of these, he is punishable as an alien. He is protected from arrest, and his goods cannot be seized in distress. Prussia is the only great European power that does not send this class of ministers. Envoys, or ministers, form the second class of diplomatists, resident ministers the third class, and chargés d'affaires the fourth.

AM'BER (*ambre: Fr.*), a hard brittle tasteless substance, generally semitransparent, or opaque, of a glossy surface and conchoidal fracture. It is susceptible of a good polish, and is worked up into ornaments. It is inflammable, and, when heated, yields a strong and bituminous odour. After it has been exposed to a slight friction, it attracts straws and other light bodies, and produces sparks, visible in the dark. The Greeks called it *electron*, from its resemblance in point of colour to an alloy of gold and silver of the same name. Whence comes our word electricity. The Romans, supposing it to be a vegetable juice, named it *succinum*, by the Arabs it is denominated *ambra*, whence the French write it *ambre*, and the English *amber*. It is believed to be of vegetable origin: the leaves and stalks of vegetables are found in it; and wasps, flies, gnats, &c., which it contains, have evidently been entangled in it while it was in the soft state. It occurs as a fossil, which is procured in large quantities on the Prussian coast of the Baltic.

AM'BERGRIS (*ambre*, amber; and *gris*, grey: *Fr.*), a solid opaque ash-coloured inflammable substance, variegated like marble, remarkably light, and, when heated, emitting a fragrant odour. It is found floating in the sea near the coast of various tropical countries, and is a morbid secretion from the liver of the spermaceti whale. It is very much prized in Asia and Africa, where it is made use of to flavour luxurious dishes: in Europe, it is highly valued as an article of perfumery.

AM'BIDEXTER (*ambo*, both; and *dexter*, a right hand: *Lat.*), a person who can use both hands with equal facility, and for the same purposes that the generality of people do their right hands.

AM'BIENT (*ambio*, I encompass: *Lat.*), a term used for such bodies, especially fluids, as encompass others on all sides: thus, the air is frequently called an ambient fluid, in consequence of being diffused round all terrestrial bodies.

AM'BIT OF A FIGURE (same *deriv.*), in Mathematics, the *Perimeter*, or the sum of the lines by which a figure is bounded.

AMBLYO'PIA (*ambluōpia*, from *amblus*, dull; and *ōps*, the sight: *Gr.*), in Medicine, a term for dimness of sight.

AMBRO'SIA (*Gr.*, from *ambrosios*, immortal), in heathen Antiquity, the food of the gods. Hence, whatever is very gratifying to the taste or smell has been termed *ambrosial.*

AM'BRY, in Ecclesiastical Architecture, a place in which were deposited charters, &c., and, when it was inside the church, the vessels of the altar. In ancient abbeys and priories, there was an office under this denomination, in which were laid up all the charities for the poor.

AMBUR'BIUM (*amb*, about; and *urbs*, a city: *Lat.*), in Roman Antiquity, a solemn procession round the city, made annually, or to avert some calamity which suddenly threatened: the victim accompanied it, and was afterwards sacrificed.

AMBUSCA'DE, or **AM'BUSH** (*embûche*, ambush: *Fr.*), in the Military art, a place where soldiers may lie concealed, till they find an opportunity to surprise the enemy.

AMEN' (truly: *Heb.*), in Scripture language, a solemn conclusion to prayer, employed by the Hebrews, signifying *verily*, or *so be it.*

AMEND'E HONORA'BLE (*amende*, a penalty: *Fr.*), in French Law, an infamous kind of punishment formerly inflicted in France on traitors, parricides, or sacrilegious persons. It was of two kinds: one consisted in the mere acknowledgment of the offence, in open court, bareheaded, and kneeling: which was called the *simple* or *dry amende*. In the other, the offender was obliged to kneel in his shirt, with a torch in his hand, and a rope about his neck, being conducted by the executioner: which was called the *amende honorable in figuris*. It was, and still is sometimes, joined with capital punishment.——The common acceptation of the term indicates that an open apology is made for an offence or injury done.

AMENTA'CEÆ (*amentum*, a thong: *Lat.*), a natural order of trees and shrubs, distinguished by their unisexual flowers, the staminiferous ones being in catkins. The order includes the birch, alder, willow, poplar, plane, hasel, beech, spanish chestnut, and oak.

AMERC'EMENT (*à merci*, at the mercy: *Fr.*), a pecuniary punishment imposed on offenders, at the mercy of the court. Amercements differ from fines, inasmuch as the latter are defined, and the former are proportioned to the fault, or more properly at the discretion of the court. The statute of Magna Charta ordains, that a freeman is not to be amerced for a small fault, but in proportion to the offence, by his peers and equals.

AMER'ICANISM, any word or phrase in general use among the inhabitants of the United States, which deviates from the English standard. Of these, a great proportion are words of local character, originally taken from different counties in England, by the first emigrants. Others are words formerly used by English writers, but which have become obsolete.

A'METHYST (*amethustos*, a remedy against drunkenness: *Gr.*), the *oriental* amethyst is a variety of CORUNDUM, and is composed almost entirely of alumina. The *common* amethyst is a variety of quartz, consisting chiefly of silica, coloured in various shades of violet, by the oxides of iron and manganese. It is usually found crystallised in six-sided prisms, with a six-sided pyramid at the end. It occurs in Europe and India. The Persians believed that wine drunk out of an amethystine cup would not intoxicate: hence the name.

AMIAN'THUS, or ASBES'TOS (*amiantos*, undefiled; *asbestos*, inextinguishable: *Gr.*), names applied to different minerals which agree in the possession of a fibrous structure, arising from the parallel position of long capillary crystals. They are varieties of amphibole. In that form called amianthus, the threads are easily separated, are very flexible, and have a silky lustre. They may be made to serve as the wick of a lamp, and can even be woven into a fire-proof cloth. It occurs in Corsica, Savoy, Cornwall, and elsewhere. Common asbestos is of a dull green colour, and has little flexibility.

AMIO'TUS (*Lat.*), in Roman Antiquity, any upper garment worn over the tunic. ——A part of the dress worn by a Roman Catholic priest, &c., under all the ecclesiastical costume, at mass, &c. It is a square piece of linen drawn over the shoulders.

AMID'-SHIPS, a Naval term, signifying in the middle of the ship, applied either to length or breadth.

AM'MON (*Amun*: *Egypt.*), the name of an Egyptian deity, whom the Romans termed Jupiter Ammon. He was usually represented with a ram's head. There was a magnificent temple erected to him in a sacred grove of trees in the oasis now called the Oasis of Siwah, with an oracle famous through many ages. It was so renowned, that Alexander the Great crossed the desert to consult it, and the priests telling him that he was the son of the god, he ever afterwards claimed divine origin. Cambyses sent an army of 50,000 men to destroy the temple, but the tradition runs that they never reached it, and never returned. Some ruins of the temple still exist.

AMMO'NIA, a colourless gas, with a strongly pungent odour, exhibiting an alkaline reaction with test paper. By pressure it may be condensed into a liquid. It is soluble in water to the extent of 700 times its volume. It is a combination of three volumes of hydrogen and one of nitrogen, but it cannot be formed directly from these gases. It must be obtained from some of its compounds; it is found in large quantities during the manufacture of coal-gas, and is a product of the decomposition of animal matters containing nitrogen. When a solution of ammonia is treated with acids, a series of salts is obtained, resembling completely the corresponding salts of potash and soda. If sal-ammoniac, which is a hydrochlorate of ammonia, is properly brought into connection with mercury, an amalgam is formed, similar to the amalgams formed by mercury, potassium, and sodium. Hence it is supposed there is a metal which has received the name of ammonium, but all attempts to obtain it as a separate substance have hitherto failed. Ammonia received its name from having been found in old times in the ordure of camels, near the temple of Ammon.

AMMO'NIAC, or GUM AMMO'NIAC, a resinous substance brought from the East Indies in drops or granules. The best kind is of a yellowish colour without, and white within. It is the produce of some umbelliferous plant not yet accurately determined.

AMMONI'TES. [See CORNU AMMONIS.]

AMMUNI'TION (*munitio*: *Lat.*), all warlike stores, and especially powder, ball, bombs, guns, and other weapons necessary for warfare.

AM'NESTY (*amnēstia*: from *a*, not; and *mnaomai*, I remember: *Gr.*), an act by which two parties at variance promise to pardon and bury in oblivion all that is past. It is more especially used for a pardon granted by a prince to his rebellious subjects.

AMO'MUM (*khamāma*: *Arab.*; *amōmon*: *Gr.*), one of the aromatic herbs formerly used for the preservation of dead bodies;

whence is derived the word *mummy*. Its aromatic seeds are much used, under the name of *cardamoms*, *grains of paradise*, &c. It belongs to the same nat. ord. as the ginger and turmeric, and is allied to the arrow-root (*Maranta*).

AMOR'PHOUS (*a*, without; *morphe*, form: *Gr.*), destitute of regular figure. Thus felspar is found both crystallised and amorphous.

AMORTIZA'TION (*mors*, death: *Lat.*), in Law, an alienation of lands or tenements in mortmain, which see.

AMPHIARTHRO'SIS (*amphi*, roundabout; and *arthroo*, I fasten by joints: *Gr.*), in Anatomy, a term for such junctures of bones as have motion similar to that of the articulation of the ribs with the vertebræ.

AMPHIB'IA (*amphibios*, living a double life: from *amphi*, on both sides; and *bia*, bodily strength: *Gr.*), a class of vertebrate animals, in which the *Batrachia* (frogs, toads, salamanders, and tritons), the *Siren* and *Proteus* are placed. In strictness it is only those animals which are equally adapted by the possession both of lungs and branchiæ for living in air and water that can be called amphibious, and this is only the case with five genera, viz. Siren, Lepidosiren, Proteus, Axolotl, and Menobranchus.

AMPHI'BOLE (*amphibolos*, equivocal: *Gr.*), in Mineralogy, one of the forms of hornblende, taking its name from its resemblance to augite.

AMPHIBO'LIA, or AMPHIBOL'OGY (*amphibolos*, equivocal; and *logos*, a discourse: *Gr.*), in Rhetoric, ambiguity of expression, when a sentence conveys a double meaning. It is distinguished from an equivocation, which lies in a single word.

AMPHIC'TYONS (according to the ancients, from *Amphictyon*, near whose temple the council was held; but probably from *amphictiones*, dwellers around: *Gr.*), in Grecian Antiquity, assemblies composed of deputies from different states of Greece. That which obtained the name, by pre-eminence, met twice a year, in the spring at Delphi, and in the autumn at Thermopylæ; and decided all differences, especially in matters of religion, between any of the Grecian states: their determinations being held sacred and inviolable.

AMPHISBÆ'NA (*amphisbaina*: from *amphi*, on both sides; and *baino*, I go: *Gr.*), a genus of harmless serpents, which are supposed capable of moving backwards or forwards, with equal facility. This belief has arisen from the two extremities being equally obtuse, and the scales of the head being the same as those on the back. They are natives of South America, and live upon ants.

AMPHITHE'ATRE (*amphitheatron*: from *amphi*, on both sides; and *theatron*, a theatre: *Gr.*), in Antiquity, a spacious edifice, built either round or oval, like a double theatre, with a number of rising seats, upon which the people used to sit and behold the combats of gladiators, or of wild beasts, and other sports. Some of them, as the Colliseum at Rome, were capable of containing from 50,000 to 80,000 spectators. The principal parts of the amphitheatre were the *arena*, or place were the gladiators fought; the *cavea*, or hollow place where the beasts were kept; the *podium*, or projection at the top of the wall which surrounded the arena, and assigned to the senators; the *gradus*, or benches, rising all round above the podium; the *aditus*, or entrances; and the *vomitoria*, or gates which terminated the aditus.

AM'PHITRITE (*Amphitrite*, a goddess of the sea), in Zoology, a genus of marine worms, living in tubes composed of grains of sand. They have short golden-coloured bristles, arranged in one or two rows, on the anterior part of the head.

AM'PHORA (*amphoreus*, having two handles: *Gr.*), in Antiquity, a liquid measure in use among the Greeks and Romans. It had two handles, and was sometimes used as an architectural ornament.

AMPLIFICA'TION (*amplificatio*, a magnifying: *Lat.*), in Rhetoric, part of a discourse or speech, in which a crime is aggravated, a praise or commendation heightened, or a narration enlarged, by such an *enumeration* of circumstances as will excite strong emotions in the minds of the auditors. It differs from *exaggeration* in which circumstances and facts are heightened in *colouring*, so as to exceed the reality.

AM'PLITUDE (*amplitudo*, size: *Lat.*), in Astronomy, an arc of the horizon, intercepted between the east or west point and the centre of the sun, or of a planet, at its rising or setting.——The word is sometimes used to express the horizontal distance to which a projectile is thrown, or the *range*. ——AMPLITUDE, MAGNETICAL, is an arc of the horizon, contained between the centre of the celestial body, when rising or setting, and the east or west point of the compass.

AMPUL'LA (*Lat.*), an ancient drinking cup; but among ecclesiastical writers, one of the sacred vessels used at the altar. The ampulla still holds a distinguished place in the coronation of the kings of England and France. That which is used in England is of the purest chased gold, and represents an eagle with expanded wings standing on a pedestal near seven inches in height, and weighing about ten ounces. It was deposited in the Tower by the Black Prince, and is still preserved there with the other regalia.

AM'ULET (*amuletum*; *Lat.*: from *hamalet*: *Arab.*), a superstitious charm or preservative against mischief, witchcraft, or diseases. Amulets were made of stone, metal, animals, and, in fact, of everything which fancy or caprice suggested. Sometimes they consisted of words, characters, and sentences, ranged in a particular order, and engraved upon wood, &c., and were worn about the neck or some other part of the body. At other times they were neither written nor engraved, but prepared with many superstitious ceremonies, great regard being usually paid to the influence of the stars.

AMUSETT'E (a toy: *Fr.*), a small one-pound cannon, formerly employed in war in mountainous regions: and which, for lightness and facility of movement, was found to possess great advantages.

AMYG'DALOID (*amygdalē*, an almond; and *eidos*, form: *Gr.*), a term applied to rocks in which minerals are imbedded, like almonds in a cake.

A'MYL (*amulon*, starch: *Gr.*), in Chemistry a hypothetical compound radical, consisting of ten atoms of carbon, and eleven of hydrogen. It forms with other substances a series of ethers and compounds, which correspond to those formed by ordinary alcohol. Potato oil and fusel oil, matters obtained on the distillation of potatoes and grain, are examples of these compounds.

A'NA, the Latin *neuter plural* termination, given to the names of amusing miscellanies, consisting of anecdotes, traits of character, and incidents relating to any person or subject. It is used in English, French, and Latin works, and was first adopted in the 'Valesiana,' which were detached observations on passages of classical antiquity by the celebrated Valois, and published at Paris in 1695.——ANA (*ana*, each: *Gr.*), among Physicians, denotes an equal quantity of the ingredients which immediately precede it in prescriptions: as syrup and water, *ana*, *aa*, or *a* ʒii.; that is, of syrup and water each two ounces.

ANABAP'TISTS (*ana*, signifying repetition; and *baptizo*, I dip under: *Gr.*), a name given to a Christian sect because they objected to infant baptism, and baptized again those who joined them. They were known in the early ages of Christianity as Cataphrygians and Novatians, &c. But they are to be distinguished from the sects which appeared in Germany in 1521, immediately after the rise of Lutheranism. These latter at first preached up an entire freedom from all subjection to the civil as well as ecclesiastical power, and committed frightful excesses; but the tenet from whence they took their name, was their rebaptizing all new converts to their sect. They were put down with some difficulty and great slaughter, their leader, Muncer, being killed. The struggle they made was a political as well as a religious one: it was a contest between the lower and upper classes. The Baptists of England form a distinct sect, without any connection with the Anabaptists here spoken of.

ANA'BASIS (a going up: *Gr.*), the title of Xenophon's description of the younger Cyrus's expedition against his brother Artaxerxes, King of Persia, B.C. 401. A body of Greek mercenaries formed part of Cyrus' army, and Xenophon accompanied them, ultimately obtaining military command. When Cyrus lost his life on the plains of Cunaxa, the retreat of the 'Ten Thousand' commenced.——Arrian also gave the name of *Anabasis* to a work in which he described the campaigns of Alexander the Great.——ANABASIS, among Physicians, denotes either the increase or augmentation of a fever in general, or of any particular paroxysm.

ANABRO'SIS (*Gr.*: from *ana*, through; and *brōsis*, an eating out), in Medicine, a corrosion of the solid parts by acrid humours.

ANACAR'DIUM (*a*, without; and *kardia*, a heart: *Gr.*, because the seeds are not within the fruit), the botanical name of the genus of the tree producing the CASHEW NUT, which see.

ANACATHAR'SIS (*Gr.*, from *anakathairo*, I cleanse thoroughly), in Medicine, a cleansing of the lungs, by expectoration.——This term is likewise applied by divines to the clearing up of obscure passages of Scripture, by a spiritual interpretation.

ANACH'RONISM (*ana*, backwards; and *chronos*, time: *Gr.*), in Literature, an error with respect to chronology, by which an event is placed *earlier* than it really happened; in which sense it stands opposite to *parachronism*.

ANACOLU'THON (*anakolouthon*, wanting sequence: *Gr.*), in Grammar or Rhetoric, a want of coherency, generally arising from inattention on the part of the writer or orator.

ANACREON'TIC VERSE, a term applied to lyrical pieces with a convivial or amatory turn, such as the Greek poet Anacreon composed. The verses of that poet have an elegant simplicity which has never been equalled by his numerous imitators.

ANADIPLO'SIS (*Gr.*, from *anadiploo*, I make double), a figure in Rhetoric and Poetry, in which the last word or words of a sentence are repeated at the beginning of the next.

ANÆSTHET'ICS (*a*, priv.; and *aistheticos*, fitted for perception: *Gr.*), substances which produce insensibility, apparently by suspending certain of the functions of the nervous system: among these, the vapour of ether and of chloroform are the most manageable, and have lately attracted much notice in reference to the performing of surgical operations under their influence.

AN'AGRAM (*anagramma*, a transposition of letters: from *ana*, up and down; and *gramma*, a letter: *Gr.*), the change of one word or phrase into another, by reading the letters backwards, or by transposing them. Anagrams were very common among the ancients, and occasionally contained some happy allusion; but perhaps none were more appropriate than the anagram made by Dr. Burney on the name of the hero of the Nile, just after that important victory took place: HORATIO NELSON, '*Honor est a Nilo.*'

ANALEC'TA (*analego*, I pick up: *Gr.*), a collection of extracts from different works.

ANALEM'MA (*analambano*, I take up: *Gr.*), in Geometry, an orthographic projection of the sphere, on the plane of the meridian.

ANALEP'TICS (same word, in the sense of *I recover*), in Medicine, restoratives which serve to repair the strength, and to raise the depressed spirits.

AN'ALOGUE (*analogos*, according to due proportion: *Gr.*), in Comparative Anatomy, an organ which resembles another in its functional relations; thus, the wing of a bird is analogous to the wing of the flying lizard, and to the wing of an insect, though it be not in its structural relations the cor responding organ of the body. [See HOMOLOGY.]

ANAL'OGY (same *deriv.*), originally signified resemblance of relations; but it is now usually understood to mean any sort of resemblance affording a ground for arguments which do not amount to a complete induction. If A and B resemble each other in certain respects, and if a proposition is true of A, it is argued that it is also true of B. The force of this argument will depend on the degree of relationship that exists between A and B.——In Geometry, it is the same as *proportion*.——In Grammar, it is a conformity to the principles of organization of the different words or collections of words.——As to its meaning in Natural History, see HOMOLOGY.

ANAL'YSIS (*analusis*, from *analuo*, I unloose: *Gr.*), in Chemistry, the separation of any substance into its constituent parts. It is either qualitative or quantitative. *Qualitative* analysis ascertains the *nature* of the elements: *quantitative*, their *relative amounts*.——VOLUMETRICAL ANALYSIS, or the quantitative estimation of chemical substances by measure, is an easy method of ascertaining the quantity of a given substance which a certain solution or compound contains. Chemists are continually needing to determine such a question, for many purposes, especially for ascertaining the commercial value of alkalis, manganese, chlorides of lime, indigo, and many other substances. Suppose, for example, we wish to know how much potash a certain solution contains. We measure off a given quantity, and ascertain how much acid of a known strength is required to saturate it. This being done, a simple calculation completes the operation, and this calculation may be spared by the inspection of a previously-prepared table.——ANALYSIS, among Grammarians, is the explaining the etymology, construction, and other properties of words.——ANALYSIS is frequently employed to signify the algebraical branches of pure mathematics.——ANALYSIS is likewise used for a brief, but methodical, illustration of the principles of a science; in which sense it is nearly synonymous with what is termed a *Synopsis*.

ANAMORPHO'SIS (*anamorphōsis*, from *anamorphoo*, I renovate: *Gr.*), in Perspective and Painting, the representation of some image, either on a plane or curved surface, deformed, or distorted; which in a certain point of view appears regular and in just proportion.

ANA'PÆST, a foot in Greek and Latin metre, consisting of two short syllables and a long one. The French language is much more abundant in anapæsts than the English, which is richer in dactyls. We have, however, several poems in an anapæstic measure, composed of couplets, each line having four anapæsts: thus,

> They are true to the last of their blood
> and their breath,
> And like reapers descend to the harvest of death.

ANAPH'ORA (a raising up: *Gr.*), the repetition of the same word or phrase at the beginning of several successive sentences.——ANAPHORA, in Astronomy, an ascension or rising of the twelve signs of the zodiac, from the east to the west, by the daily course of the heavens.

ANAPLEROT'ICS (*anaplēroo*, I fill up: *Gr.*), medicines which promote the growth of flesh in wounds and ulcers.

A'NARCHY (*anarchia*, want of government: *Gr.*), a disorderly society without a government.

ANASAR'CA (*ana*, throughout; and *sarx*, the flesh: *Gr.*), a diffusion of water through the cellular membrane of the limbs, as in *dropsy*.

ANASTAL'TICS (*anastaltikos*, fit for putting back: *Gr.*), in Pharmacy, astringent or styptic medicines.

ANASTAT'IC PRINTING (*anastasis*, a setting up again: *Gr.*), a process by which the productions of typography, lithography, or engraving, may be transferred from the originals without injury to them, and afterwards fixed on metal or wood, so as to be printed from again.

ANASTOMO'SIS (*Gr.*, from *anastomoo*, I furnish with a mouth), *Inosculation:* applied to the opening of one vessel into another. It occurs with arteries, veins, and lymphatics, in the animal body.

ANAS'TROPHE (*Gr.*, from *anastrepho*, I turn upside down), in Rhetoric, the inversion of words in a sentence, or the placing them out of their natural order.

ANATH'EMA (a person exposed to public reprobation: *Gr.*), among Ecclesiastical writers, the word is usually intended to express the cutting off a person from the privileges of society, and from communion with the faithful. The anathema differs from simple excommunication, inasmuch as the former is attended with curses and execrations.

ANA'TOMY (*anatomē*, from *anatemno*, I cut up: *Gr.*), in its widest sense, signifies the dissection of organized bodies, with a view to discover their structure, and the connection of the parts. Anatomy is the basis of Physiology, the object of which is the discovery of function; and both form the indispensable basis of Medicine. The object of *Comparative Anatomy* is the discovery of the differences in structure and organization which obtain throughout the animal kingdom, from the simplest forms to the most complex, and from the earliest dawn of life on the planet to the present epoch. *Descriptive Anatomy* is concerned with healthy structure, and is the necessary basis of *Pathological Anatomy*, which is concerned with diseased structures.

AN'CESTORS (*ancêtres: Fr.*), those from whom a person is descended in a direct line, the father and mother not included. Both law and custom make a difference between ancestors and predecessors, the first being applied to a natural person, as a man and his ancestors, and the latter to a body politic, as a bishop and his predecessors.

AN'CHOR (*ankura: Gr.*), a heavy, strong, crooked instrument of iron, cast or dropped from a ship into the water, to retain her in a convenient station in a harbour, road, or river. Anchors were at first mere weights: afterwards, as at present, they were intended to fasten in the ground. They are so contrived as to sink into the earth the moment they reach it, and to bear a great strain before they can be loosened or dislodged. Every ship has, or ought to have, three principal anchors, with a cable to each, viz. the *sheet*, the *best bower*, and the *small bower*, so called from their usual situation on the ship's bows. There are besides small anchors for moving a ship from place to place in a harbour or river, where there may not be room or wind for sailing; these are the *stream*-anchor, the *kedge*, and the *grapnel*. The last, however, is chiefly designed for boats.

AN'CHORAGE (same *deriv.*), ground fit for holding the anchor; also the duty paid by ships for the use of the haven where they cast anchor.

AN'CHORET, AN'CHORITE, or ANACH'ORET (*anachōrētēs*, from *anachōreo*, I withdraw: *Gr.*), in a general sense, means a hermit, or one who voluntarily lives apart from the world. Retirement from all society has, by vast numbers, been considered as facilitating the attainment of a virtuous life. In Egypt and Syria, where Christianity became strongly tinged with the peculiar notions of the East, the anchorets were most numerous; and from those who lived in cells in the vicinity of a church, sprang the convents of a later period, which were filled with inmates anxious to escape from the tumult and bloodshed that marked the beginning of the middle ages.

ANCHO'VY (*ancioe: Ital.*), a small sea-fish belonging to the genus *Engraulis* of Naturalists. It is allied to the herring, and is taken in large quantities in the Mediterranean by night-fishing. It is also taken on the British coasts.

ANCHYLO'SIS (*ankulōsis*, from *ankuloo*, I crook: *Gr.*), in Medicine, a stiffness or immobility of the joints, arising from various causes, and often connected with deformities of the limbs. For the most part it is the result of inflammation in the membrane lining the joints.

ANCO'NES (*ankōn*, the bent arm: *Gr.*), in Architecture, the consoles, or ornaments on the key stones of arches or sides of doors.

ANCY'LE or ANCI'LE (*Lat.*), in Antiquity, a small brazen shield belonging to Mars, which fell, as was pretended, from heaven in the reign of Numa Pompilius: when a voice was heard, declaring that Rome should be mistress of the world as long as she should preserve this holy buckler.

ANCYLOBLEPH'ARON (*Gr.*: from *ankulos*, crooked; and *blepharon*, the eyelid: *Gr.*), in Medicine, a disease of the eye which closes the eyelids.

ANCY'LOGLOS'SUM (*ankulos*, crooked; and *glōssa*, the tongue: *Gr.*), in Medicine, a contraction of the ligaments of the tongue, so as to hinder speech.

ANDAN'TE (going: *Ital.*), in Music, an indication that the notes are to be distinct from each other.——ANDANTE LARGO signifies that the music must be slow, the time exactly observed, and each note distinct.

ANDANTI'NO (*Ital.*), in Music, gentle, tender; somewhat slower than *andante*.

ANDROG'YNOUS (*andro-gunos*, hermaphrodite: *Gr.*), in Botany, an epithet for plants bearing separate male and female flowers on the same root, without any mixture of hermaphrodites.——In Physiology, the possession of organs, of both sexes, in each individual, as in the snail.

ANDROI'DES (*andros*, of a man; and *eidos*, the form: *Gr.*), in Mechanics, a term used to denote an automaton in the figure of a man, which, by means of certain springs and other mechanical contrivances, is enabled to walk, and perform other actions of a man.

ANEMOM'ETER (*anemos*, the wind; and *metron*, a measure: *Gr.*), apparatus for indicating, measuring, and recording, the direction, force, and velocity, of the wind. Various contrivances have been invented for these purposes, and some one of them is to be found in every meteorological observatory. Various contrivances have been invented for this purpose; the first of which is attributed to Wolfius, who described it in 1709; but considerable improvements have been since made in its construction. During the experiments made by Dr. Lind with his anemometer, he found, in one instance, that the force of the wind was such as to be equal to upwards of 34 lbs. on a square foot, answering to a velocity of 93 miles per hour!

ANEM'ONE (*anemos*, the wind: *Gr.*), a beautiful flower, originally brought from the East, but now much cultivated in our gardens, nat. order, *ranunculaceæ*. Some species are wild in Britain. The word signifies properly wind-flower, because it was supposed that it opened only when the wind blew.

ANEM'OSCOPE (*anemos*, the wind; and *scopeo*, I examine: *Gr.*), any contrivance for showing from what point of the compass the wind blows.

ANE'PIGRAPHOUS (*a*, without, *epigraphe*, an inscription: *Gr.*), in Numismatics, an epithet applied to coins which bear no inscription.

A'NEROID BAROM'ETER (*a*, without; *neros*, humid; and *eidos*, form: *Gr.*, on account of no fluid being used), an instrument for indicating the variations of atmospheric pressure, and differing from the ordinary barometer in this, that while, in the latter, the pressure of the atmosphere is measured by the height of the column of mercury which it supports; in the former, the differences of pressure are measured by the effect produced on a partially exhausted metallic vessel, the opposite sides of which are more or less brought together, according as the pressure of the atmosphere is greater or less. A spiral spring resists the compression of the sides: the motion is magnified by levers, and is communicated to an index which moves round a dial-plate.

AN'EURISM (*aneuruno*, I widen: *Gr.*),

in Surgery, a diseased swelling of an artery, attended with a continued pulsation.

AN'GEL (*angelos*, a messenger: *Gr.*), the name given to those spiritual, intelligent beings, who are supposed to execute the will of God, in the government of the world.——ANGEL, the name of an ancient gold coin in England, so called from having the figure of an angel upon one side. It was introduced from France in the time of Edward IV., and was used till the reign of Charles I.; varying in value from 6s. 8*d.* to 10*s.*

ANGEL'ICA, in Botany, a genus of plants of the natural order *Umbelliferæ*. All the parts of angelica, especially the root, have a fragrant aromatic smell, and a pleasant bitterish taste. It is useful in medicine.

AN'GELUS DOMI'NI (angel of the Lord: *Lat.*), a prayer of the Roman Catholic Church, embodying a passage in scripture beginning with these words. It was ordered by pope John XXII., in 1326, to be repeated three times a day, morning, noon, and night, when the church bell gives the people warning. This prayer is also termed *Ave Maria* (Hail Mary), from this invocation being repeatedly employed in it.

ANGI'NA (*ancho*, I strangle: *Gr.*), the *Quinsy*, an inflammatory disease of the throat. Also, a consequence of organic disease of the heart, which causes difficulty of respiration, and is hence called *angina pectoris*. Angina is accompanied by anxiety, and a sense of suffocation.

ANGIOSPER'MOUS (*aygeion*, a vessel; and *sperma*, seed: *Gr.*), a term applied by botanists to such plants as have their seeds enclosed in a seed-vessel. [See SEED.]

AN'GLE (*angulus*, a corner: *Lat.*), the opening, or mutual inclination, of two lines, or of two or more planes, meeting in a point called the *vertex*, or angular point. ——ANGLE OF DIRECTION, that comprehended between the lines of direction of two conspiring forces.——ANGLE OF ELEVATION, in Astronomy, the angular height of a celestial object above the horizon.——FACIAL ANGLE, the angle made by the intersection of two lines, the one drawn from the most prominent part of the frontal bone over the anterior margin of the upper jaw, the other from the external orifice of the ear-passage along the floor of the nasal cavity.——ANGLE, in Fortification, that formed by the lines used in fortifying, or making a place defensible.——ANGLE, in Geometry. When the lines forming it meet perpendicularly, it is called a *right* angle, and is of 90 degrees; when it is less than a right angle, it is called an *acute* angle; and when larger than a right angle, an *obtuse* angle. When two circles cross each other, their planes form what is called a *spherical* angle. The angles made by solids are called *solid* angles.——ANGLE OF INCIDENCE, in Optics, the angle which a ray of light, falling upon a reflecting surface, makes with a perpendicular erected on that surface from the point where the ray impinges. The angle of incidence is invariably equal to the angle of reflection. ——ANGLE OF LONGITUDE, in Astronomy, the angle which is made at the pole of the ecliptic by two circles, one passing through the celestial object, the other through the vernal equinox.——ANGLE OF PARALLAX, the angle made by two lines, the one supposed to be drawn from a celestial object to the observer as he actually stands, and the other to the centre to which its motion is referred—the centre of the earth, or the centre of the earth's orbit.——VISUAL ANGLE, that formed by two rays of light, drawn from the extreme points of an object to the centre of the eye.

AN'GLER, or FISHING FROG, a marine fish of singular form, called by Ichthyologists *Lophius piscatorius*. It has a large broad head, a very wide mouth, and three long detached bony rays projecting from its head. It is very voracious, and has been taken from Norway to Madeira.

AN'GLICISM (*anglus*, English: *Lat.*), an idiom of speech, or manner, peculiar to the English.

AN'GLING, the art of ensnaring fish with a hook, which has been previously baited with a small fish, a worm, or a fly, &c. The best season for angling is from April to October: the cooler the weather, in the hottest months, the better; but in winter, on the contrary, the warmest day is the most promising. A cloudy day, after a moonlight night, is in all cases favourable; as the fish avoid feeding by moonlight, and are therefore hungry. Warm, lowering days are always coveted by anglers.

ANGLO-SAX'ON, the name of the English people, when the Saxons and some other German tribes had settled in England, after it was abandoned by the Romans in the fifth century, and had introduced their language, government, and customs.——ANGLO-SAXON LANGUAGE, that which was used after the conquest of England by the Saxons, and Saxon had become the prevalent tongue of that country. It is the basis of our present English.

ANGUI'NEAL (next) denotes something belonging to or resembling a snake. Hence we say, anguineal curve, hyperbola, verse, &c.

AN'GUIS (*Lat.*), in Zoology, a genus of harmless reptiles, to which our blind-worm belongs.

ANGUSTU'RA CORTEX, a bark which comes from the Spanish main, and is a powerful bitter. A poisonous bark is sometimes found in commerce under the name of Spurious Angustura.

ANHY'DROUS (*a*, without, *udor*, water: *Gr.*), in Chemistry, a term applied to acids, salts, &c., when they are entirely free from water. A salt, for example, may appear perfectly dry to the eye and to the touch, at the very time that water is present. It is not until this is driven off that the salt is rendered anhydrous. Some acids have so strong an affinity for water that it is with the utmost difficulty they can be procured anhydrous.

ANIL'INE (*anil*, indigo: Portuguese), a pale, brownish, oily liquid, obtained in proportionally minute quantity from coal tar, but now manufactured on a large scale for dyeing purposes. It is a compound of carbon, hydrogen, and nitrogen; its specific gravity is slightly heavier than water. When aniline or its salts are treated with suitable oxidizing agents a number of brilliant dyes are produced, which have come into extensive use. The first of these made commercially available was Perkins's mauve-purple, obtained by treating sulphate of aniline with bichromate of potassium. By the use of this and other salts every shade of purple may be obtained from it, from the deepest royal to faint lilac; every variety of blue from a pale sky tint to the deepest ultramarine; all the gradations of scarlet and crimson, including roseine, magenta, &c.; besides many shades of yellow and green. The dyes thus produced are very intense, a few pounds weight of the dye being capable of colouring some miles of fabric. A pound of it will impart a perceptible tint to a large pond of water.

AN'IMA (the soul: *Lat.*), the soul, or principle of life in animals.——ANIMA MUNDI, a phrase formerly used to denote a certain pure ethereal substance or spirit, supposed to be diffused through the mass of the world, organizing and actuating the whole and the different parts.

AN'IMAL (a living creature: *Lat.*), a living body endued with sensation and spontaneous motion. The difficulty of drawing the line of demarcation between the animal and vegetable kingdoms is acknowledged by all naturalists. The lowest forms of each are well-nigh undistinguishable, and have been attributed by turns, first to one and then to the other domain of organized existence. It is, however, said that the best distinction hitherto ascertained is drawn from the fact that the food of plants consists of inorganic compounds, whilst animals require organized matter for their support, coupled with the facts that the alimentary matter of plants is absorbed through their external surface, no solid particles being taken in, whilst that of animals goes direct into their substance. As to the arrangement of animals, see ANIMAL KINGDOM.

AN'IMAL FUNC'TIONS are those by which the materials that constitute and support the bodies of animals are prepared and supplied. The principal of these functions are the following: circulation, digestion, nutrition or assimilation, respiration, and secretion: which are employed in producing animal matter from the substances that compose it, repairing waste, and getting rid of what is superfluous. But, besides these, there are others, which, though they do not act like the foregoing, are, in many animals, subservient to various important purposes.

AN'IMAL HEAT is that property of all animals by which they preserve a certain temperature, quite independent of that of the medium by which they are surrounded, and is essentially necessary to life. That of a man in health is from about 94° to 100° Fahrenheit. Birds maintain a temperature of about 108° F. This heat appears to depend upon the absorption of oxygen in the lungs, and throughout the body: carbonic acid being formed in the lungs by the union of oxygen with carbon, and water throughout the body by the union of oxygen with hydrogen—heat and vital energy being in both cases the result. Hence this general slow combustion, which is constantly going on in the body, is most intimately connected with the state of the nervous system. The heat of the human body remains nearly the same, when exposed to extreme degrees of temperature. Fishes, reptiles, and most invertebrate animals, are cold-blooded. They have not the power of maintaining a uniform temperature, and their heat depends upon that of the surrounding medium.

AN'IMAL KING'DOM, THE, is divided by naturalists into five provinces or sub-kingdoms: viz. 1. VERTEBRATA (animals with a jointed back-bone). 2. MOLLUSCA (shell-fish and their allies). 3. ARTICULATA (crabs, spiders, insects, worms). 4. RADIATA (sea-urchins and star-fishes). 5. PROTOZOA (sponges, foraminifera, &c.).

ANIMAL'CULA (plur. of *animalculum*, a *dim.* of *animal*: *Lat.*), a term popularly applied to very small organisms requiring the aid of lenses for their detection. [See INFUSORIA.]

ANIMA'TION (*animatio*, a bestowal of life: *Lat.*), in Painting, the expression given to a figure when representing activity. A figure well executed is said to be animated. ——SUSPENDED ANIMATION. Life may suffer considerable diminution of its powers, and even a total suspension, without being absolutely destroyed. The action of the lungs, and consequently all the functions of the body, depend upon the free use of air. The want of this great principle of life causes faintings in crowded assemblies; and it is from the same privation of air that drowning and suffocation produce suspended animation and then death.

AN'IME', or GUM ANIME', a resinous substance, imported from New Spain and the Brazils, which is obtained from a leguminous tree, the *Hymenæa Courbaril* of Botanists. It is now known to be inert, and therefore of little value as a remedy. ——ANIME', in Heraldry, a term used when the eyes of any rapacious creature are borne of a different tincture from the creature itself.

AN'IMUS (the mind: *Lat.*), in Metaphysics, the mind or reasoning faculty, in distinction from *anima*, the being in which the faculty exists.——ANIMUS, in Law, signifies intention, for example, he went *animo revertendi*, with the intention of returning.

AN'ISE-SEED (*anison*, the anise or dill: *Gr.*), the product of an umbelliferous plant (*Pimpinella Anisum*) which grows wild in Egypt, Syria, and other countries of the East. Anise-seeds are imported from Spain and Italy, where they are cultivated to a considerable extent. They are chiefly used in the manufacture of liqueurs, and as a remedy against flatulency.

AN'NALS (*annales*, chronicles of things done year by year: *Lat.*), a species of history in which events are related in the exact order of chronology. They differ from perfect history in this, that *annals* are a bare relation of what passes every year, as a journal is of what passes every day; whereas *history* relates not only the transactions themselves, but also their causes, motives, and springs.

ANNA'TES (*Fr.*, from *annus*, a year: *Lat.*), in Ecclesiastical Law, first-fruits paid out of spiritual benefices to the pope, being the value of one year's profit.——Also a fine paid to the king, as head of the church, by one promoted to an ecclesiastical benefice. It is supposed to amount to one year's value of it: but it is less, as it is founded on a valuation made in 1535.

ANNEA'LING (*anhelan*, to anneal: *Sax.*), the process of heating steel and other bodies, and then suffering them to cool again gradually. Without this, many substances are extremely brittle, and liable even to break simply under slight changes of temperature—for instance, glass.

ANNE'LIDA (*annulus*, a little ring: *Lat.*), in Zoology, the class of worms, forming an extensive section of invertebrate animals with bodies marked off into rings. This class has hitherto received little attention from naturalists, and many thousands remain to be described and classified. They abound far more in the sea than on land. They have been divided into those with and those without bristles. The former section has been again divided into *Memertini*, worms without a sucker, and *Hirudinei*, such as leeches, which possess a sucker. The worms possessing bristles may be divided into three sections. 1. *Lumbricini*, the earth-worms. 2. *Capiti branchiati*, those having the blood-aerating organs attached to the head, such as the Serpulæ; many of these live in tubes constructed by themselves. 3. *Dorsi branchiati*, those having the blood-aerating organs attached to the rings of the body, such as the lob-worms.

AN'NO DOM'INI (in the year of our Lord: *Lat.*), abbreviated A.D., a term employed in the computation of time. The era commencing with the birth of Christ is used in dating all public deeds and writings, in Christian countries, on which account it is called the 'Vulgar Era.'

ANNO'NÆ PRÆFEC'TUS (overseer of the annona: *Lat.*), in Antiquity, an extraordinary magistrate, whose business was to prevent a scarcity of provisions, and to regulate the weight and fineness of bread.

ANNOTA'TION (*annotatio*, from *annoto*, I write down: *Lat.*), a brief commentary, or remark upon a book or writing, in order to clear up some passage, or draw some conclusion from it.——ANNOTATION, in Medicine, the beginning of a febrile paroxysm, when the patient grows chilly, yawns, shudders, or the like.

ANNOT'TO, an orange-red substance obtained from the waxen pulp or pellicle surrounding the seeds of *Bixa orellana*, a South American tree. It is used in dyeing, for varnishes and for colouring cheese.

ANNU'ITY (*annus*, a year: *Lat.*), a periodical payment of money for a lengthened period. If it is to begin on the occurrence of some uncertain event, it is a *contingent annuity*. If it is not to be enjoyed immediately, it is a *deferred annuity;* if not until the death of some one now living, it is a *reversionary annuity*. As the probability of the duration of life at every age is known, annuities may be purchased for fixed sums during a life or lives in being.

AN'NULAR (*annularis*, from *annulus*, a ring: *Lat.*), anything in the form of, or resembling, a ring. Hence, ANNULAR, in Anatomy, is an appellation given to several parts of the body: thus, the *annular cartilage* is the second cartilage of the larynx; the *annular ligament* is a strong ligament encompassing the wrist, after the manner of a bracelet; and *annular process* is that which surrounds the medulla oblongata. ——In Astronomy, an eclipse is said to be annular when a ring of light is left on the body eclipsed.

AN'NULATA (same *deriv.*), a large class of soft-bodied animals marked with rings, including the leeches, the earth-worms, and many marine worms, some of which live in tubes. This class is sometimes styled ANNELIDA, which see.

AN'NULET (*annulus*, a ring: *Lat.*), in Architecture, a small square moulding, which crowns or accompanies a larger. Also, though improperly, the fillet which separates the flutings of a column. Also, in Heraldry, a small ring.

ANNUNCIA'TION (*annunciatio*, from *annuncio*, I make known: *Lat.*), the delivery of a message, particularly the angel's message to the Virgin Mary, concerning the birth of our Saviour. The festival in commemoration of that event is called Lady-day, and falls on the 25th of March.

AN'ODE (*ana*, up; and *odos*, a way: *Gr.*), the way by which electricity *enters* a body through which it passes. It is opposed to *Cathode*.

AN'ODYNES (*anodunos*, free from pain: *Gr.*), medicines so called because they relieve pain and procure sleep, such as the preparations of the poppy. They are divided into three classes: *Paregorics*, or such as assuage pain; *Soporifics*, or such as procure sleep; and *Narcotics*, or such as ease the patient by stupefying him.

ANOMALIS'TICAL YEAR (*anōmalos*, irregular: *Gr.*), in Astronomy, the time that the earth takes to pass from any point in the ecliptic round to the same point.

ANO'MALY (*anōmalia*: *Gr.*, from same *deriv.*), any irregularity or exception to a rule.——ANOMALY, in Astronomy, the angular distance of a planet from its perihelion, as seen from the sun. It is of three kinds, the *true*, the *mean*, and the *excentric*. ——In Grammar, an exception from the general rule.

ANO'MIA (*anomios*, unequal: *Gr.*), a genus of bivalve shell-fish allied to the oyster. The valves are unequal, and one is perforated near the hinge. A plug passes through the hole and attaches the animal to a submerged rock.

ANO'PLURA (*anoplos*, unarmed; *oura*, a tail: *Gr.*), an order of insects with suctorial mouths, including the louse and its allies, which live parasitically on other animals. Almost every species of bird and quadruped has a peculiar species of this order attached to it. They do not undergo any metamorphosis.

ANOREX'IA (*Gr.*: from *a*, without; and *orexis*, a desire for a thing), in Medicine the loathing of food. It is either original, or symptomatic of some disorder.

ANOS'MIA (*a*, without; and *osmē*, smell: *Gr.*), in Medicine, a disease attended with a diminution or loss of smell.

AN'SER (*anser*, a goose: *Lat.*), a genus of swimming birds with webbed feet, of which the common goose may be taken as an example.

ANT, in Entomology, well-known insects, much celebrated for industry and economy. They belong to the *Hymenoptera*, an order of insects with membranaceous wings, and distinguished by not being armed with a sting, or any instrument for piercing the bodies of animals, or plants, for the purpose of depositing their eggs. Ants are social insects, and are divided, like the bees and wasps, into males, females, and neuters, which last constitute the great mass of this tribe, and appear to conduct the business of the nest. The neuters are unproductive females, their ovaria being undeveloped. Their heads are very large, and the mouth is armed with strong mandibles. The males die, or are killed by the neuters, before the eggs they have impregnated are excluded. The productive females die soon after the eggs are matured and excluded. They, like the males, have four well developed wings, by means of which they can fly. The eggs which the queen ant deposits and the larvæ when hatched, are tended with the most careful solicitude by the workers. The pupæ are as well looked after, and when the time has arrived for the perfect insect to emerge from its cocoon, the workers are at hand to aid in its release. At a particular period some of the pupæ produce perfect males and females, which after a while take flight and pair. The impregnated females denude themselves of their wings, and in many cases are seized by a colony of workers, carried into a nest, and tended on until they have deposited their eggs. Naturalists have divided the ants they have examined into many genera. Several of our British forms fall into the genus *Formica*. They feed on both animal and vegetable substances. White ants belong to a different order of insects. [See TERMITES.]

ANTANACLA'SIS (*Gr.*, from *antanaclao*, I reflect sound), in Rhetoric, a figure which repeats the same word, but in a different sense; as 'dum vivimus, vivamus.'

ANTARC'TIC (*antarktikos*: from *anti*, against; and *Arktos*, the Bear: *Gr.*), in a general sense, denotes something opposite to the Arctic, or northern pole. The *Antarctic circle*, in Geography and Astronomy, is one of the lesser circles of the sphere, and is distant only 23½° from the Antarctic, or south pole. The stars near the Antarctic pole never appear above our horizon.

ANTARES, a star of the first magnitude in the Scorpion; it is the α Scorpii of Astronomers.

ANT'-EATERS, a genus (*Myrmecophagæ*) of toothless quadrupeds, allied to the sloths, inhabiting South America. There are several species: one as small as a squirrel, another as large as a calf. One is terrestrial, the others arboreal. Again, some are diurnal, others nocturnal in their habits. They feed on termites, or white ants, which they lick up with their long flexible tongues. The great ant-eater, remarkable for its long slender muzzle, is a harmless animal, but it has been known to kill a dog with its claws when attacked. Its flesh is eaten in some parts of South America.

ANTECE'DENCE (*antecedo*, I go before: *Lat.*), in Astronomy, an apparent motion of a planet towards the west, or contrary to the order of the signs, viz. from Taurus towards Aries, &c.

ANTECE'DENT (*antecedens*, going before: *Lat.*), in Grammar, the word to which a relative refers: thus, in 'God whom we adore,' the word *God* is the antecedent to the relative *whom*.——ANTECEDENT, in Logic, the first of the two propositions in an enthymeme.——ANTECEDENT, in Mathematics, the first of two terms of a ratio, or that which is compared with the other: thus, in the ratio of 2 to 3, or *a* to *b*, 2 and *a* are each antecedents.——ANTECEDENT SIGNS, in Medicine, such as are observed before a distemper is so formed as to be reducible to any particular class, or proper denomination.

AN'TELOPES (*anthos*, an ornament; and *ōps*, the eye: *Gr.*, from the beautiful eye of the gazelle), are ruminating animals, forming a division of the family of *Bovidæ*. In form they resemble the deer, but have unbranched hollow horns, frequently very large. In shape they are elegant animals, timid in disposition, and rapid in flight. The gazelle is an antelope, and in South Africa there are several other species, including the springbok and the harte-beeste.

ANTEM'BASIS (*Gr.*, from *antembaino*, I enter instead), in Anatomy, a mutual insertion of the bones.

AN'TE MERI'DIEM (before noon: *Lat.*), abbreviated A.M., in Astronomy, the time before noon.

ANTENCLE'MA (*Gr.*: from *anti*, in return for; and *enclema*, an accusation), in Oratory, a defence in which the accused replies to the charge by criminating the accuser.

ANTEN'NÆ (*antenna*, a sail-yard: *Lat.*), in Zoology, jointed processes with which the heads of some animals, such as crustaceans and insects, are furnished. They are of various shapes; they are commonly called horns or feelers.

ANTEPENUL'TIMATE (*ante*, before; *pene*, almost; and *ultima*, the last: *Lat.*), the last but two.

ANTEPOSI'TION (*antepono*, I place before: *Lat.*), a Grammatical figure, by which a word, that by the ordinary rules of syntax ought to follow another, comes before it.

ANTHELMIN'TICS (*anti*, against; and *helmins*, a worm: *Gr.*), medicines proper to destroy worms.

AN'THER (*anthēros*, blooming: *Gr.*), that part of the stamen of a flower which is at the top of the filament; it is usually divided into two cavities, which are filled with pollen, minute grains that are discharged when ripe, and these falling upon the pistil impregnate the ovary. Anthers are generally yellow, that being the usual colour of the pollen.

AN'THESIS (bloom, from *anthos*, a flower

Gr.), in Botany, the period at which the flower-bud opens.

ANTHO'LOGY (*anthologia*, a gathering of flowers: *Gr.*), a name given to a collection of short pieces of poetry, which are frequently called *epigrams*. The first collection of this kind was made by Meleager, a Syrian Greek poet, who lived about a century before the birth of Christ.

AN'THRACITE (*anthrax*, a coal: *Gr.*), a species of coal containing more carbon and less bituminous matter than the ordinary kind. Inferior anthracite and the smaller kinds of good coal constitute *culm*. Some are of opinion that anthracite was originally bituminous coal, and that the alteration has been caused by subterranean heat. In North Wales, the two kinds are sometimes found as portions of the same bed. There is a coal, known as steam coal, which is intermediate between the two. Anthracite is inflammable with some difficulty, and burns without smell or smoke, leaving a more or less earthy residue. It has no special value of its own, and is only used when it can be obtained cheaper than other kinds. It is scarce in Europe, and consequently but little used; but in the United States of America, where it abounds, it has lately acquired a high degree of importance.

ANTHRO'POID (*anthropos*, a man; *eidos*, shape: *Gr.*), a term applied to certain apes, such as the gorilla, orang-outang, chimpanzee, and gibbon, on account of a certain amount of resemblance to the human species which they possess.

ANTHROPO'LOGY (*anthrōpos*, a man; *logos*, a discourse: *Gr.*), the science which has man for its object. It undertakes to describe and classify the races of men, to point out their similarities and differences, to study their manners and capabilities, and to determine their relationship. Since the races of men, notwithstanding their differences, form an entire group, anthropologists examine that group as a whole, and endeavour to ascertain its position in the scale of organic nature, its relations to other groups, and its common characters, whether under an anatomical, a physiological, or an intellectual point of view. The laws which govern the maintenance or change of these characters, the influence of external conditions, the phenomena of hereditary transmission, and the effect on the offspring of intermarriage of nearly related persons, or of persons of different races, are studied, as well as the grand subject of the history of humanity through the stages of its development. There are Anthropological Societies in London and Paris.

ANTHROPOMOR'PHITE (*anthropos*, a man; *morphē*, shape: *Gr.*), one who ascribes a human figure and a bodily form to God.

ANTHROPO'PHAGI (*anthropophagoi*: from *anthrōpos*, a man; and *phago*, I eat: *Gr.*), or CANNIBALS, persons who eat the flesh of men.

AN'TI, a Greek particle which enters into the composition of several words, in Latin, French, English, &c., and signifies opposite or contrary to; as in *antiscorbutics*.

ANTICAR'DIUM (*antikardion*: from *anti*, opposite to; and *kardia*, the heart: *Gr.*), in Anatomy, that hollow opposite the heart called the pit of the stomach.

ANTI-CLI'MAX (*anti*, opposite to; and *klimax*, a gradation: *Gr.*), in Literary Composition and Oratory, a descent from the great to the little.

ANTI'CLINAL (*anti*, against; and *clino*, I incline: *Gr.*), in Geology, a term applied to an axis, the strata of which slope in opposite directions; in opposition to *synclinal* (*sun*, together: *Gr.*), where the strata dip towards each other.

AN'TIDOTE (*antidotos*: from *anti*, against; and *didōmi*, I give: *Gr.*), a counter-poison, or any medicine generally that counteracts the effects of what has been swallowed.

ANTIL'OGY (*antilogia*, a contradiction: from *anti*, opposite to; and *logos*, a discourse: *Gr.*), an inconsistency between two or more passages of the same book.

ANTIMETA'BOLE (*Gr.*: a transformation: from *nati*, against; and *metaballo*, I change), in Rhetoric, a setting of two things in opposition to each other.

ANTIMETA'THESIS (*anti*, against; and *metatithēmi*, I transpose: *Gr.*), in Rhetoric, an inversion of the parts or members of an antithesis.

AN'TIMONY, a metal of a bluish white colour. It is so brittle that it is easily reduced to powder. Its spec. grav. is 6·7; and it fuses, at 810°, just below redness. Its principal ore is the sulphuret, known in commerce as *crude antimony*, and the metal is obtained by fusing the sulphuret with scrap iron, when the iron unites with the sulphur and turns out the antimony. *Glass of antimony* is an impure oxide. *Tartar-emetic* is a tartrate of antimony and potash. *Type metal* is an alloy of antimony and lead; on account of its expanding at the moment of solidifying (a property possessed by neither metal separately) it takes a very sharp impression of the mould.

ANTINO'MIANS (*anti*, against; and *nomos*, a law: *Gr.*), in Church History, a sect who reject the moral law as a rule of conduct to believers. They consider good works as unnecessary, and faith alone as sufficient for salvation; and hence are sometimes called *Solifidians* (*sola fides*, faith alone: *Lat.*).

ANTIPA'THES (*anti*, against; *pathe*, suffering or misfortune: *Gr.*), a genus of flexible corals, of a dark brown colour, which are usually branched into delicate twigs, the whole looking like a small leafless shrub. The substance is horny and very similar to that composing the axis of the Gorgonias, but it is destitute of a calcareous bark. When fresh from the sea they are covered with gelatinous matter, formed of dead polypes. The stems are sometimes thick, and so hard that they will take a polish. They are frequently called Black Coral.

ANTI'PATHY (*antipatheia*: from *anti*, against; and *pathos*, a violent feeling: *Gr.*), in Physiology, a natural aversion of one body to another, in contradistinction to *sympathy*. In a more restricted sense, it is an involuntary aversion which is felt towards some object perceived either in reality or by the imagination, although the person who feels this abhorrence is entirely ignorant of its cause, and can by no means account for it.

ANT'IPHON (*antiphoneo*, I sing against: *Gr.*), in Church Music, the short verse sung before the Psalms and other portions of the Roman Catholic service.

ANTI'PHRASIS (*Gr.; from anti*, opposite to; and *phrasis*, a phrase: *Gr.*), in Rhetoric, a kind of irony, in which we use words in a sense opposite to that which belongs to them: as when we say, 'you are very clever,' when we mean, 'you are very stupid.'

ANTI'PODES (*Gr.:* from *anti*, against; and *pous*, a foot), the name given to those inhabitants of the earth who are diametrically opposite to each other, as it were feet to feet. They have the same or equal latitudes—the one north, and the other south; but opposite longitudes. Consequently, when it is day to the one, it is night to the other.

AN'TIQUARY (*antiquarius*, from *antiquus*, ancient: *Lat.*), a person who searches after and studies the monuments and remains of antiquity.——The monks who were employed in making new copies of old books were formerly called *antiquarii*.

ANTI'QUITIES (*antiquitas*, antiquity: *Lat.*), the remains of ancient historical times; genealogies, inscriptions, monuments, coins, names, archives, mechanical instruments, fragments of history, &c. Antiquities form a very extensive branch of learning, referring to ancient edifices, magistrates, habiliments, manners, customs, ceremonies, religious worship, and other objects worthy of curiosity, of all the principal nations of the earth. There is a Society of Antiquaries in London, which received its charter of incorporation in 1751.

ANTISABBATA'RIANS (*anti*, against; and *sabbaton*, the Sabbath: *Gr.*), those who deny the necessity of observing the Sabbath.

ANTIS'CII, or ANTIS'CIANS (*anti*, opposite to; and *skia*, shadow: *Gr.*), an old term in Geography, signifying the people who live on different sides of the equator, and whose shadows at noon fall in opposite directions.

ANTISEP'TICS (*anti*, against; and *sēpo*, I make rotten: *Gr.*), things which prevent putrefaction, such as creosote, alcohol, and ice.

ANTISPASMO'DICS (*anti*, opposite to; and *spasmos*, a spasm: *Gr.*), medicines proper for the prevention or cure of spasms or cramps.

ANTIS'TROPHE (*antistrophē*, from *antistrepho*, I turn about: *Gr.*), the alternate verse in ancient poetry, which was divided into the *strophe* and *antistrophe*. In reciting odes the chorus turned from the left to the right at the *strophe*, and from the right to the left at the *antistrophe*.

ANTI'THESIS (*Gr.*, from *antitithēmi*, I set one thing against another), in Rhetoric, a figure of speech, by which two things are made more striking by being set in opposition to each other. 'Antitheses, well managed,' says Bohours, 'give infinite pleasure in the perusal of works of genius; they have nearly the same effect in language as lights and shadows in painting, which a good artist distributes with propriety: or the flats and sharps in music, which are mingled by a skilful master.' The beautiful antithesis of Cicero, in his second oration against Catiline, may serve as an example: 'On the one side stands modesty, on the other impudence; on the one fidelity, on the other deceit; here piety, there sacrilege,' &c. It is imputed as a fault to some writers that they have carried the use of antithesis to excess, frequently employing an antithetical form of words, when there is no antithesis in the thought.

ANTITRINITA'RIANS (*anti*, against: *Gr.;* and *Trinitas*, the Trinity: *Lat.*), all those who deny the doctrine of the Trinity.

AN'TITYPE (*anti-tupos*, a copy: *Gr.*), among Ecclesiastical writers, that which was foreshadowed by the type or figure. In the Greek church it is also an appellation given to the symbols of bread and wine in the sacrament.

ANTŒ'CI (*antoikoi:* from *anti*, opposite to; and *oikos*, a house: *Gr.*), in Geography, those inhabitants of the earth who live under the same meridian, but on different sides of the equator, and at equal distances from it.

ANTONOMA'SIA (*Gr.*: from *anti*, instead of; and *onoma*, a name), a mode of speaking in which a proper name is put for an appellative, as when a patron of learned men is called a Mæcenas, or when a person is addressed or described by some appropriate or official designation, but not by his surname; as, in the House of Lords, 'the noble lord.'

A'NUS, in Anatomy, the excrementary orifice of the alimentary canal, or termination of the *intestinum rectum*. In oviparous vertebrates, it opens into a cavity common to it and the urinary organs, called the *cloaca*. In many of the lower classes of invertebrate animals, one orifice performs the functions of a mouth and anus.

AORIS'TIA (*Gr.:* from *aoristos*, indefinite), in the Sceptic philosophy, that state of the mind in which we neither assert nor deny anything positively, but only speak of things as seeming or appearing to us in such a manner.

AOR'TA (usually derived from *aēr*, the air; and *tēreo*, I keep: *Gr.*; being found empty after death, it was supposed by the older anatomists to be intended to convey air), in Anatomy, the great artery issuing from the left ventricle of the heart. All the other arteries proceed mediately or immediately from the aorta. It is distinguished into the *descending* and *ascending* aorta, according to the direction it takes.

AP'ATHY (*apatheia*, insensibility: *Gr.*), a term expressive of an utter privation of passion, and an insensibility to pain. Thus, the Stoics affected an entire apathy, so as to be unconscious of pleasure or pain, and incapable of being moved by anything.

AP'ATITE, a mineral found in Canada, Norway, and Spain; composed chiefly of phosphate of lime, and hence useful as a manure. It has the advantage over coprolites in containing less siliceous matter and carbonate of lime.

APAU'ME' (*paume*, the palm of the hand: *Fr.*), in Heraldry, a hand opened, so that the full palm appears, with the thumb and fingers extended, as may be seen in the arms of a baronet.

APEAK, perpendicular. A ship is said to be *apeak*, when the cable is drawn so tight as to bring her directly over the anchor.

APEP'SIA (*a*, without; and *pepsis*, digestion: *Gr.*), in Medicine, a bad digestion; the more usual term for which is *Dyspepsia*.

APES, quadrumanous mammalian animals, which have their teeth of the same number and form as in man, and have neither tails nor cheek pouches. Apes approach nearer to man in organization than do any other animals. All of them have the power of walking in an erect position [See CHIMPANZEE, GIBBON, GORILLA, ORANG-OUTANG.]

APET'ALOUS (*apetalos:* from *a*, without; and *petalon*, a leaf: *Gr.*), in Botany, a term for plants whose flowers have no corolla.

A'PEX (*Lat.*), in its general sense, the top, summit, or highest degree of anything. ——In Antiquity, a little woollen tuft on the cap of the flamen, or high-priest.—— In Mathematics, the point of a cone.

APHÆ'RESIS (*aphairĕsis*, from *aphaireo*, I take away: *Gr.*), in Grammar, the removal of a letter or syllable from the beginning of a word. —— In Surgery, an operation by which something that is superfluous is taken away.

APHE'LION (*apo*, from; and *hēlios*, the sun: *Gr.*), in Astronomy, that point of its orbit at which the earth, or any planet, is at the greatest distance from the sun.

A'PHIDES, in Entomology, the plural of *Aphis*, the genus to which *Plant Lice* belong. These are homopterous insects, which are sometimes wingless and sometimes furnished with four wings, feeding upon the juices of plants, especially those of young shoots. Some species are remarkable for secreting on the leaves of trees a sweet fluid, known as honey-dew, which is eagerly sought for by ants. The *Aphis Humuli*, or Hop Fly, is in some years very destructive to the crop; and it is to this cause that the variations of the hop crop from year to year are mainly due. Not long ago an aphis made its appearance all at once on the grain fields of New England, and in the State of New York, in such astonishing numbers, that in old time it would have been looked upon as a miraculous occurrence. In many fields the insect swarmed to an extent that the crop seemed smothered. It was found that the insect commenced bearing when it was only three days old, and produced four young ones daily. Thus the descendants of a single aphis will in twenty days amount to more than two millions. The Aphides are also very remarkable in regard to the phenomena attending their reproduction. The eggs produce females which will for many generations (as many as eleven have been counted) produce living young ones without the presence of a male insect amongst them. This is a striking instance of what has been called PARTHENO-GENESIS.

APHLOGIS'TIC (*aphlogistos:* from *a*, not; and *phlogistos*, burnt: *Gr.*), not inflammable. An *aphlogistic lamp* is one in which a coil of platinum wire is kept in a state of ignition by vapour of alcohol or ether, without flame.

APHO'NIA (*Gr.:* from *a*, without: and *phōnē*, a voice), in Medicine, a deprivation of voice, arising from palsy of the tongue.

APH'ORISM (*aphorismos*, from *aphorizo*, I define: *Gr.*), a maxim or principle of a science; or a sentence which comprehends a weighty truth in a few words.

APHRI'TE (*aphros*, foam: *Gr.*), a mineral substance, so called from its frothy appearance. It is a soft friable carbonate of lime.

APH'THÆ (*aphthai: Gr.*), in Medicine, the thrush; small, round, and superficial ulcers arising in the mouth. The principal seat of this disease is the extremity of excretory vessels. salivary glands, &c.

APHYL'LOUS (*aphullos:* from *a*, without; and *phullon*, a leaf: *Gr.*), in Botany, an epithet applied to plants which have no leaves, their place being taken by scales. Many species of cactus are aphyllous.

A'PIARY (from next), a place where bees are kept. It should be selected with great care; should be sheltered from the wet as well as from the extremes of heat and cold; should face the south, be defended from high winds, and not be within the sphere of offensive smells, or liable to the attacks of any hostile vermin.

A'PIS (*Lat.*), in Entomology, a genus of bees, including the hive-bee, *Apis mellifica*. [See BEE.]——In Mythology, APIS was the name of a bull to which divine honours were paid by the Egyptians, chiefly at Memphis.

APLANA'TIC (*aplanētos*, not gone astray: *Gr.*), in Optics, a term applied to that kind of refraction which causes rays to converge exactly to the true focus, and without the production of colour. It differs therefore from *achromatic*, in which colour has been corrected.

APO'CALYPSE (*apokalupto*, I disclose: *Gr.*), the Greek name of the last book of the New Testament, termed in English the Revelations. It was at one time generally attributed to the Apostle John, and supposed to have been written in the isle of Patmos, whither he had been banished by the emperor Domitian. Other authors have been named, and some wholly reject it as spurious. On account of its metaphorical language, the Apocalypse has been explained differently by almost every writer who has ventured to interpret it; and for the same reason it is one of those parts of the Bible which have furnished all sects with quotations to support their creeds or opinions. Bishop South's opinion of it was that it either found a man mad or left him so.

APO'COPE (*Gr.*, from *apokopto*, I cut off), in Grammar, a figure by which the last letter or syllable of a word is cut off.

APO'CRYPHA (*apokruptos*, hidden: *Gr.*), in Theology, certain books of doubtful authority which are not received into the canon of Holy Writ by the Reformed Churches, being considered as either spurious or not acknowledged as of divine origin; but nearly all of them are received by the Roman Catholic church, as of equal authority with the books of Scripture. They were never, however, on the canon of the Jews; they are not quoted by the authors of the New Testament; they contain manifest inconsistencies; and some of them even countenance tenets at variance with orthodox religion.

APO'CYNACEÆ, a nat. order of plants, of which many have a poisonous juice. They have monopetalous flowers, and a remarkable stigma, forming at the base a sort of ring. To this order belong our common periwinkle, the oleander, and some tropical plants with showy flowers, some of which are cultivated in our hothouses, such as the *Allamanda*, *Dipladenia*, *Plumieria*, and *Echites*.

A'PODAL (*a*, without; and *pous*, a foot: *Gr.*), a term applied by naturalists to fishes which have no ventral fins, like many eels.

APODIC'TICA (*apodeiktikos*, demonstrative: *Gr.*), in Rhetoric, an epithet for arguments which are fitted for proving the truth of any point.

APODIOX'IS (*Gr.*, from *apodiōko*, I drive away), in Rhetoric, a figure by which we either pass over a thing slightly, or reject it as unworthy of notice.

APODIX'IS (*Gr.*, from *apodeiknumi*, I point out), in Rhetoric, an evident demonstration.

APOD'OSIS (*Gr.*, from *apodidomi*, I explain), in Rhetoric, the latter part of a complete exordium, or the application of a simile.

AP'OGEE (*apo*, from; and *gē*, the earth: *Gr.*), in Astronomy, when the earth is at its greatest distance from the sun, the latter is said to be in *apogee*, and the earth in its *aphelion*; when at its least distance from the sun, that body is said to be in *perigee*, and the earth in its *perihelion*. Apogee and perigee are terms derived from that exploded system which considered the earth to be the centre round which the sun and planetary bodies circulated.

AP'OGRAPH (*apo*, from; and *grapho*, I write: *Gr.*), a copy or transcript of some book or writing.

APOLLINA'RIANS (from *Apollinarius*, Bishop of Laodicea, their founder), in Church History, a sect who maintained that Jesus Christ had a sensitive, but not a rational human soul, the divine nature supplying its place.

APOL'LO BEL'VIDERE, a famous marble statue of Apollo, which was found amongst the ruins of Antium, twelve leagues from Rome. It was purchased by pope Julius II. when a cardinal, and removed by him when pope to the Belvidere at the Vatican, whence its name. The left hand and the right fore-arm are modern restorations. The name of the sculptor is unknown, but it is thought to have been carved in the time of the emperor Nero.

AP'OLOGUE (*apologos*: *Gr.*), a poetical fiction, the purpose of which is the improvement of morals. Some writers are of opinion that this term ought to be confined to that species of fable in which brutes or inanimate things—as beasts or flowers—are made to speak.

APONEURO'SIS (*apo*, from; and *neuron*, a nerve: *Gr.*), in Anatomy, a tendinous membrane, expanded over the muscles of the limbs. The older anatomists gave it this name, because they believed tendons to be derived from nerves.

APOPH'ASIS (a denial: *Gr.*), a figure of speech, in which the orator briefly alludes to, or seems to decline stating, that which he wishes to insinuate.

AP'OPHTHEGM, or AP'OTHEGM (*apophthegma*: *Gr.*), a short sententious and instructive remark, especially if pronounced by a person of distinguished character.

APOPH'YGE (*apophugē*, a flight: *Gr.*), in Architecture, the part of a column where it springs out of its base.

APOPH'YLLITE (*apo*, from; and *phullon*, a leaf: *Gr.*), a mineral belonging to the *Zeolite* family, of foliated structure and a peculiar pearly lustre. When a fragment is forcibly rubbed against a hard body, it separates into thin laminæ.

APO'PHYSIS (a sprout: *Gr.*), in Anatomy, a projecting part or process of a bone. The various processes of the joints of the vertebræ are thus named, with the addition of prefixes to distinguish them. [See VERTEBRÆ.]

AP'OPLEXY (*apoplexia*, from *apoplēsso*, I strike down: *Gr.*), a disorder in which, while the patient is suddenly deprived of the exercise of all the senses, and of voluntary motion, a strong pulse remains with a deep respiration, attended with a stertor, and the appearance of a profound sleep. Complete apoplexy is produced by the pressure of blood (whether extravasated or not) upon the brain; and it is most usually found to accompany persons of a full habit of body, who have a short neck and a system disposed to a too copious sanguification.

APOS'TASY (*apostasia*, from *aphistamai*, I stand apart: *Gr.*), the quitting any system of thinking or acting, good or bad; but the word is generally used in a reproachful sense of one who has changed his religious opinions.

APOSTAX'IS (a trickling down: *Gr.*), in Medicine, any defluxion, but particularly of blood from the nose.

A POSTERIO'RI (from the latter: *Lat.*) [See A PRIORI.]

APOS'TLE (*apostolos*, one sent: *Gr.*), properly a person delegated or sent by another upon some business; and hence, by way of eminence, one of the twelve disciples commissioned by Jesus Christ to preach the gospel.

APOS'TROPHE (*Gr.*, from *apostrepho*, I turn aside), a figure of speech by which the orator turns from his subject to address a person either absent or dead, as if he were present.——APOSTROPHE, in Grammar, a mark of contraction in a word; thus, *lov'd* for *loved*.

APOTHEO'SIS (*Gr.*, from *apotheŏo*, I deify), deification, or the ceremony of placing men among the gods. The ancients deified all those who had invented things useful to mankind, or who had done any important service to the commonwealth. This honour was also conferred on several of the Roman emperors at their decease.

APOTH'ESIS (*Gr.*, from *apotithemi*, I put away), in Surgery, the placing of a fractured limb in the position in which it ought to remain.

AP'OTOME (*Gr.*, from *apotemno*, I cut off), in Music, the difference between the greater and the less semitone; also, the difference between the whole tone and the major semitone.——In Geometry, the difference between two lines or quantities, commensurable only in power. Thus, the diagonal of a square minus, one of the sides is the apotome, and is equal to $\sqrt{2} - 1$.

AP'PANAGE (*Fr.*), lands appropriated by the sovereign to the younger sons of the family as their patrimony; the reversion being reserved to the crown, on failure of male heirs.

APPARA'TUS (*Lat.*), the component parts of machinery; or a set of instruments or utensils necessary for practising any art.

APPA'RENT (*appareo*, I appear: *Lat.*), in a general sense, something that is visible to the eyes, or obvious to the understanding.——APPARENT, among Mathematicians and Astronomers, denotes things as they appear to us, in contradistinction from what they really are: thus we say, the apparent diameter, distance, magnitude, place, figure, &c., of bodies. In Astronomy, the apparent altitude of a star is the angle made by the line of vision with the horizon, while the real altitude requires the effect of parallax, &c., to be taken into account. The apparent diameter of a planet is measured by the angle made by two lines from the eye to opposite points of its disk: the real is a line joining these points. The apparent or sensible horizon is a plane tangential to the earth's surface at the place of the observer; the true horizon is a plane parallel to this, passing through the centre of the earth, &c.——APPARENT, in Law, is an epithet for an heir whose right of inheritance is indefeasible, as the heir *apparent;* or the immediate heir to the crown, in distinction from the heir *presumptive*.

APPARI'TION (*apparitio*, from same *deriv.*), in Astronomy, signifies a star or other luminary becoming visible, which before was hid: it is opposed to *occultation*. The *circle of apparition* is an imaginary line, within which the stars are always visible in any given latitude.

APPA'RITOR (*Lat.*), among the Romans, a general term to comprehend all attendants of judges and magistrates, appointed to receive and execute their orders.——APPARITOR, in English Law, a messenger that serves the process of a spiritual court.

APPEAL' (*appello*, I call upon: *Lat.*), in Law, the removal of a cause from an inferior to a superior court or judge, when a person thinks himself aggrieved by the sentence of the inferior judge. Appeals from the English and Irish Courts of Chancery and Common Law, from the Scotch Court of Session, and from the Probate and Divorce Courts, lie to the House of Lords. Appeals from the Indian and Colonial Courts, the Ecclesiastical Courts, and the Court of Admiralty, lie to the Sovereign in Council, and are heard by the Judicial Committee of the Privy Council.

APPEAR'ANCE (*appareo*, I appear: *Lat.*), in Perspective, the projection of a figure or body on the perspective plane.——In Astronomy, the same as *phenomenon* or *phasis*.——In Law, it signifies, in strictness, a party presenting himself in a court of law personally; but in some cases it may be effected through another.

APPEL'LANT, or APPEL'LOR (*appello*, I call upon: *Lat.*), in Law, he who makes or brings an appeal.

APPEL'LATIVE (same *deriv.*), in Grammar, a noun or name applicable to a whole species or kind, as, a man, a horse.

APPEN'DANT (*appendo*, I hang to: *Lat.*), in Law, anything that is inheritable, belonging to some more worthy inheritance; thus, an advowson, common, or court, may be appendant to a manor, land to an office, &c.

APPENDIC'ULATE (same *deriv.*), in Botany, having appendages.

APPEN'DIX (*Lat.*), in Literature, a treatise or supplement added at the end of a work, to render it more complete.

APPLICA'TION (*applicatio*, from *applico*, I put one thing to another: *Lat.*), in Geometry, is either the applying one quantity to another, or the transferring a given line into a circle or other figure, so that its end shall be in the perimeter of the figure, &c.——The *application* of one science to another is the use made of the principles of the one in perfecting the other: as in the application of algebra and geometry to mechanics; of mechanics to geometry; of geometry and astronomy to geography; of geometry and algebra to natural philosophy, &c.——APPLICATION, in Medicine, anything administered, externally or internally, by way of a remedy.

APPOGIATU'RA (*appogiare*, to lean upon: *Ital.*), in Music, a small note placed before another, from which it borrows half or a quarter of its value.

APPOSI'TION (*appositio*, from *appono*, I put to: *Lat.*), in Grammar, the placing two or more substantives together, referring to the same person or thing, without any copulative between them, as, 'Wellington, the conqueror.'

APPRAIS'ING (*apprecier*, to set a price upon: *Fr.*), the valuation of goods by competent persons. They are in some cases sworn to make a true return.

APPREHEN'SION (*apprehensio*, from *apprehendo*, I lay hold of: *Lat.*), in Logic, the first or most simple act of the mind, by which it perceives or is conscious of some idea: it is more usually called *perception*.

APPREN'TICE (*apprendre*, to learn: *Fr.*) a young person bound by indentures or

articles of agreement to a tradesman or artificer, to learn his trade.

APPROACH'ES (*approcher*, to approach: *Fr.*), in Fortification, the works thrown up by the besiegers, in order to get nearer a fortress without being exposed to the enemy's fire.

APPROPRIA'TION (*Fr.*, from *proprius*, peculiar: *Lat.*), in Ecclesiastical Law, the annexing a benefice to the proper and perpetual use of a religious house, bishopric, college, &c.; in the same way as *impropriation* is the grant of a benefice to a lay person or corporation; that which is an appropriation in the hands of religious persons, being usually called an impropriation in the hands of the laity.

APPRO'VER (*approbo*, I prove: *Lat.*), in Law, one who, confessing that he has committed a felony, is admitted to give evidence against his accomplices.

APPROXIMA'TION (*approximo*, I approach: *Lat.*), in a general sense, the getting near to an object.——In Mathematics, a continual approach to a root or quantity sought, but not expected to be found.

APPUI' (a support: *Fr.*), in the Manège, the sense of the action of the bridle in the horseman's hand. Thus, a horse has *no appui* when he cannot suffer the bit to bear even slightly upon the parts of the mouth; or *too much appui* when he throws himself too much upon the bit, &c.—— POINT D'APPUI, in the Military art, is a term for any particular given point or body upon which troops are formed, or by which they are marched into line or column.

AP'PULSE (*appulsus*, an arrival: *Lat.*), in Astronomy, the approach of a planet towards a conjunction with the sun or any of the fixed stars.

A'PRIL (probably contracted from *aperilis*, from *aperio*, I open: *Lat.*; because the earth, in this month, begins to open for the growth of plants), the fourth month of the year, according to European computation.

A PRIO'RI, A POSTERIO'RI (from something before, from something after: *Lat.*), logical terms, which are loosely employed to distinguish two lines of reasoning. An *a priori* argument is one derived from axioms, or admitted data, or previous facts, rendering the examination of the case before us unnecessary, in order to arrive at a conclusion respecting it: an *a posteriori* argument is one derived from the facts of the case itself. To show how vaguely the terms are applied, this instance may be given. From certain facts ascertained by astronomers, it was argued that there must be another planet attached to our system, which had not then been discovered. Now, as this conclusion was arrived at *previous to* the actual discovery of the planet Neptune, the reasoning might be called *a priori*. But it may also be styled *a posteriori* reasoning, since the existence of an unknown planet was inferred from the disturbances of the motions of the known planets, by the unknown planet itself.

APSE (*apsis*, a curved form: *Gr.*), in Ancient Architecture, the arched roof of a room, the canopy of a throne, &c.——In Ecclesiastical Architecture, the curved end of a church where the altar was placed.

AP'SIDES, or AP'SES (*apsis*, a wheel, or any curved form: *Gr.*), in Astronomy, the two points of a planet's orbit in which it is at its greatest and least distance from the sun. The line which joins them is called the *line of apsides*.

AP'TEROUS (*apteros*, wingless: from *a*, without; and *pteron*, a wing: *Gr.*), a term applied by naturalists to insects destitute of wings.

AP'TERYX (*a*, without; *pterux*, a wing: *Gr.*), the scientific name of the bird KIWI-KIWI, which see.

APYREX'IA (*apurexia*: from *a*, without; and *puretos*, a fever: *Gr.*), in Medicine, the abatement of a fever.

A'QUA (*Lat.*), water.

AQUAFOR'TIS (strong water: *Lat.*), the common name of nitric acid.

AQUA RE'GIA (royal water: *Lat.*), a combination of nitric and hydrochloric acids: so called because it dissolves gold, the king of metals. It is the chlorine of the latter acid which chiefly attacks the metal, and a chloride of gold is the product.

AQUARI'UM (*aqua*, water: *Lat.*), or AQUAVIV'ARIUM (*vivarium*, a preserve: *Lat.*), a small tank, usually of glass, for the maintenance of water-plants and animals in a living state. Both marine and fresh-water objects may be thus preserved for the study of their habits, mode of growth, &c.

AQUA'RIUS (the water-bearer: *Lat.*), in Astronomy, a constellation which makes the eleventh sign in the zodiac. It is said to have been called Aquarius, or the water-bearer, because the sun moves through it in parts of January and February, when the weather is usually rainy.

AQUATIN'TA (*aqua*, water; and *tincta*, dyed: *Lat.*), a style of engraving, or rather etching, by which an effect is produced similar to that of a drawing in Indian ink.

AQUA VI'TÆ (water of life: *Lat.*), a name applied to ardent spirits, answering to the *eau de vie*, or brandy of the French, and the *usquebaugh* of the Irish.

AQ'UEDUCT (*aquæ-ductus*, a channel for conveying water: *Lat.*), a construction of stone, &c., built to preserve the level of water, and convey it, by a canal, from one place to another. There are aqueducts under the ground, and others above it, supported by arches. The Roman aqueducts were noble works: remains of them are found not only in Italy, but in other parts of Europe. In the time of the emperor Nerva nine aqueducts supplied Rome, and delivered 27,743,100 cubic feet daily. At a later period there were twenty, which are estimated to have afforded 50,000,000 cubic feet. Near Nismes in the south of France there is an aqueduct 873 feet long and 188 feet high, built by the Romans, to convey water to the town from springs which are 14 miles distant. Aqueducts have been erected in modern times: that constructed by Louis XIV. for conveying the waters of the Eure to Versailles is about 4,400 feet long, and upwards of 200 high. It contains 242 arcades, forming 726 arches of 50 feet span. A supply of water is brought to Lisbon by an aqueduct which has a length of 56,380 feet. The work at the valley of Alcantara is 2,873 feet long, with a height at the middle of 226 feet.

A'QUILA (an eagle: *Lat.*), the eagle. It was reckoned by the ancients not only the king of birds, but the minister of Jupiter, who is said to have carried Ganymede up into heaven in the form of an eagle. It was also chosen as the symbol of empire, first by the Persians, and afterwards by the Romans; in consequence of which the eagle is seen on coins in a variety of forms. But the most frequent use of the eagle was on the Roman standards, upon which it was represented in gold or silver, with expanded wings.

AQUILA'RIA, see ALOES WOOD.

AQUILE'GIA (same *deriv.*), *columbine*, nat. order, *Ranunculaceæ*, a plant so called because of the resemblance its nectaries are supposed to bear to the eagle's claws.

ARABES'QUE, or MORESQUE, a style of decoration, in which flowers, fruits, curved lines, &c., were whimsically painted or sculptured in combination. The Moors and Arabians rejected the representations of human and animal forms, but in modern arabesques, these are usually introduced. Raffaelle painted some beautiful arabesques in the Vatican.

AR'ABIC FI'GURES, the numeral characters now used in Arithmetic. They were borrowed from the Arabians, and introduced into England about the eleventh century.

ARABO-TEDES'CO (*arabo*, Arabic; and *tedesco*, German: *Ital.*), a style of Architecture, in which are combined the Moorish, Roman, and German Gothic.

ARACHNI'DA (*arachnē*, a spider: *Gr.*), in Zoology, a class of articulate animals considered distinct from the true Insecta. They are wingless, have a head which is not usually distinct from the thorax, possess four pairs of legs, and the antennæ are modified into a prehensile or mandibuliform apparatus. To this class belong the SCORPIONS, which have an articulated abdomen, the SPIDERS, the Mites and their allies, and some minute parasites, such as the Mange-mite and the Itch-mite.

ARACHNOI'DES (*arachnē*, a spider; and *eidos*, form: *Gr.*), in Anatomy, an appellation given to several different membranes, as the tunic of the crystalline humour of the eye, the external lamina of the pia mater, and one of the coverings of the spinal marrow.

AR'ACHNOLO'GY (*arachnē*, a spider; *logos*, a discourse: *Gr.*), that branch of science which is concerned with SPIDERS and their allies.

ARÆOM'ETER (*araios*, thin; and *metron*, a measure; *Gr.*), an instrument for measuring the density or gravity of fluids, and usually made of glass. It consists of a round hollow ball, which terminates above in a long slender stem hermetically sealed, and below in a shorter stem ending with a smaller ball, in which is placed as much mercury as will keep the instrument floating in an erect position. The longer stem is divided into degrees or parts, which are numbered, to show the depth of its descent into any liquor; for that fluid is heaviest in which it sinks least, and lightest in which it sinks deepest. [See HYDROMETER.]

ARÆ'OSTYLE (*ariostulos*: from *arios*, thin; and *stulos*, a column: *Gr.*), in Architecture, a sort of intercolumniation in which the columns are at a considerable distance from each other.

AR'BITER (*Lat.*), in Civil Law, a person appointed by the magistrate, or chosen by the parties, to decide any point of difference; an umpire.

ARBITRA'TION, or **ARBIT'REMENT** (*arbitratio*, from *arbitror*, I award: *Lat.*), a power given by two or more contending parties to some person or persons to determine the dispute between them. Their decision is called an *award*.

AR'BOR (a tree: *Lat.*), in Mechanics, the principal spindle or axis, which communicates motion to the rest of the machine.

AR'BOR DIA'NÆ (the tree of Diana: *Lat.*), the figure of a tree formed by an amalgam of silver and mercury, which appears to vegetate in a very beautiful manner. The experiment is thus performed. One part of silver being dissolved in a sufficient quantity of nitric acid, the solution is diluted with 20 parts of clean water, and poured upon 2 parts of mercury. After a short time a crystallization will take place in the shape of a tree, with its branches, &c. It obtained its name from silver having been called Diana by the old chemists.

AR'BOR SCIEN'TIÆ (the tree of knowledge: *Lat.*), a general distribution or scheme of science or knowledge.

AR'BOR VI'TÆ (the tree of life: *Lat.*), evergreen shrubs belonging to the genus *Thuja*, nat. ord., *Coniferæ*.

ARBORES'CENT (*arboresco*, I become like a tree: *Lat.*), a term applied to all such things as resemble trees; thus we say arborescent shrubs.

ARBU'TUS (*Lat.*), the strawberry-tree; a beautiful evergreen shrub, bearing a fruit not unlike the strawberry. It belongs to the nat. ord. *Ericaceæ*, an order in which the heaths are placed.

ARC (*arcus*, a bow: *Lat.*), any part of a regular curve, such as a circle and ellipse.

ARCA'NUM (a secret: *Lat.*), among the old philosophers, any remedy, the preparation of which was industriously concealed, in order to enhance its value.

ARCH (*arcus*: *Lat.*), a building in form of a curve. Arches are either circular, elliptical, or straight.—*Pointed arches* are usually described by two segments on the sides of a supposed triangle. When this triangle is equilateral, it is an *equilateral arch*; when *acute*, a *lancet arch*; and when *obtuse*, a *drop arch*. *Elliptical arches* consist of a semi-ellipsis, and have commonly a key-stone and imposts; they are usually described by workmen on three centres. *Straight arches* (as they are improperly called) are used over doors and windows. They have, both above and below, plain straight edges, which are parallel: but the ends and joints point towards a centre. The term arch is peculiarly used for the space between the two piers of a bridge, for the passage of water, vessels, &c. It is not known in what country the arch was first invented: it is not found in any certainly ancient Egyptian building; nor was it used in the early Greek temples, &c. Its value was soon perceived by the Romans; for we find it in the *Cloaca Maxima*, the great common sewer of ancient Rome, constructed, most probably, in the time of the Tarquins. The pointed arch was introduced in the Middle Ages.——DIURNAL ARCH, in Astronomy, that part of a circle described by the heavenly body between its rising and setting. The *nocturnal arch* is that which is described between its setting and rising. ——TRIUMPHAL ARCH, in Ancient Architecture, a stately gate adorned with sculpture, inscriptions, &c., generally consisting of three arches, that in the centre being higher than the others; and erected in honour of those who had deserved a triumph.——ARCH (*archos*, chief: *Gr.*), as a syllable prefixed to another word, denotes the highest degree of its kind, whether good or bad; as *archangel, archduke, archbishop, archfiend*, &c. Many of the highest offices in different empires have this syllable prefixed to them.

ARCHÆOLO'GY (*archaios*, ancient; and *logos*, a discourse: *Gr.*), the study of Antiquities.

AR'CHAISM (*archaios*, ancient: *Gr.*), any antiquated word or phrase. The use of archaisms, though generally objectionable, occasionally adds to the beauty and force of a sentence.

ARCHBISH'OP, a metropolitan prelate, having several suffragan bishops under him. In England there are two archbishops—the archbishop of Canterbury, who is primate of *all* England; and the archbishop of York, who is styled primate of England. The first establishment of archbishops in England, according to Bede, was in the time of Lucius, said to be the first Christian king in Britain; but the first archbishop of Canterbury was Augustine, appointed A.D. 598, after the conversion of Ethelbert.

ARCHDEA'CON (*archos*, chief; and *diakonos*, minister: *Gr.*), an ecclesiastical officer next below a bishop in rank. Every diocese has one, and the majority more. Archdeacons are usually appointed by their diocesans; but their authority is independent. They visit the clergy, and have courts for the punishment of offenders by spiritual censures, and for hearing some other causes that fall within ecclesiastical cognizance.

ARCH'DUKE (*erz*, chief: *Germ.*), a title borne by the sons of the emperors of Russia and Austria.

ARCH'ERY (*arc-tirrerie*, the drawing of the bow: *Fr.*), the art of shooting with the bow and arrow. Since the introduction of gunpowder, the arrow has ceased to be employed as an offensive weapon; but in former times it was reckoned of the utmost importance to the military strength of this kingdom. The practice of archery was followed both as a recreation and a duty, and Edward III. prohibited all useless games that interfered with it on holidays and other intervals of leisure. By an act of Edward IV. every man was to have a bow of his own height, to be made of yew, hazel, or ash, &c.; and mounds of earth were to be raised in every township for the use of the inhabitants. Indeed, it appears from the use made of the bow by the English at the battles of Cressy, Agincourt, and Poictiers, that their claim to be considered the best of modern archers can scarcely be disputed. Artillery was originally a French term, signifying archery; and the London Artillery Company was a fraternity of bowmen.

ARCH'ES, or COURT OF ARCHES, the supreme court belonging to the archbishop of Canterbury, to which appeals lie from all the inferior courts within his province. *The Dean of the Arches*, who sits as the Archbishop's deputy, is the judge of this court. The name originated from the court having been held in the church of St. Mary-le-Bow (Bow Church), London, which was built on arches.

AR'CHETYPE (*archetupos*: from *archē*, an origin; and *tupos*, a type: *Gr.*), the first model of a work, which is copied when the work is executed.——In Comparative Anatomy, the plan or scheme of structure to which, in the opinion of some, organic beings existing and extinct variously approximate. Thus an archetype vertebrate skeleton has been described, which the skeletons of all known vertebrata shadow forth without being completely possessed by any. The *archetypal world*, among Platonists, means the world as it existed in the idea of God before the visible creation.

AR'CHIL, a violet-red paste used in dyeing: prepared, by the aid of air, moisture, and an ammoniacal liquor, from several species of lichen, but principally from those belonging to the genus *Roccella*.

AR'CHITECT (*architektōn*: from *archos*, the chief; and *tectōn*, a builder; *Gr.*), one who is skilled in architecture. The architect forms plans and designs for edifices, conducts the work, and directs the artificers employed in it.

AR'CHITECTURE (*architectura*: *Lat.*), the art of inventing and drawing designs for buildings, or the science which teaches the method of constructing any edifice for use or ornament. It is divided into *civil, military*, and *naval*, according as the erections are for civil, military, or naval purposes; and, for the sake of convenience, other divisions are sometimes introduced. Civil Architecture appears to have been among the earliest inventions, and its works have been commonly regulated by some principle of hereditary imitation. Whatever rude structure the climate and materials of any country have obliged its early inhabitants to adopt for their temporary shelter, the same structure, with all its prominent features, has been afterwards in some measure kept in view by their refined and opulent posterity. To Greece we are indebted for the three principal orders of architecture, the *Doric*, the *Ionic*, and the *Corinthian*; Rome added the *Tuscan* and the *Composite*, both formed out of the former. Each of these orders has a particular expression; so that a building may be rude, solid, neat, delicate, or gay, according as the Tuscan, the Doric, the Ionic, the Corinthian, or the Composite is employed. The columns of the several orders are easily distinguishable by the ornaments that are peculiar to their capitals; but the scientific difference consists in their proportions. The Tuscan order is characterized by its simplicity and strength. It is devoid of all ornament. The Doric is enlivened with ornaments in the frieze and capital, and the shaft is often fluted. The Ionic is ornamented with the volute scroll, or spiral: its ornaments are in a style between the plainness of the Doric and the richness of the Corinthian. The Corinthian is known by its capital being adorned with two sorts of leaves, between which rise little stalks, of which the volutes that support the highest part of the capital are formed. The Composite is nearly the same as the Corinthian, with an addition of the Ionic volute. In their private buildings the Roman architects followed the Greeks; but in their public edifices they far surpassed them in gorgeous magnificence. During the dark ages which followed the destruction of the Roman empire, the classic architecture of Greece and Rome was lost sight of, or most unskilfully copied; but was again revived by the Italians at the time of the restoration of letters. All the debased styles, which sprang from vain attempts to imitate the ancients, and which flourished from the destruction of the Roman power till the introduction of the Gothic, have been united under one term, the *Romanesque*. The origin of the *Gothic* style is a matter of great uncertainty. At first it was rude; but it ultimately exhibited grandeur and splendour, with the most accurate execution. The *Saxon* and *Norman styles* were so called because they were respectively used by the Saxons, in this country, before the Conquest, and by the Normans after it in the building of churches. The *Saxon* employed the semicircular arch, which seems to have been borrowed from the Romans. It was generally plain, but sometimes ornamented with rude and massive mouldings. The heads of small openings were often formed of two straight stones laid against each other. The quoins were usually of hewn stones, placed alternately flat and on end, a mode commonly termed 'long and short.' The walls were often decorated externally with flat vertical strips of stone, slightly projecting, and somewhat resembling pilasters. There is scarcely any one example containing all the peculiarities of this style; nor, indeed, is there a certainty that any building now remaining decidedly belongs to it. The *Norman* was at first very rude and heavy; its walls were very thick and generally without buttresses. The arches, both within and without, were semicircular, and supported by very plain and massive columns. The windows had no mullions, but were generally arranged in pairs, sometimes under a larger arch. Buttresses, when used, were broad, of small projection, often without breaks; and terminated under the cornice; neither spires nor pinnacles were employed. The imposts of the doors, &c., were massive and rudely carved: and external walls were frequently ornamented with interlaced arches. The Chapel of the White Tower, in London, is a fine specimen of this style. The Saxon and Norman, particularly the latter, continued to be the prevailing modes of building in England until the reign of Henry II., when a new mode was introduced, which was called *Modern Gothic*, or the *Pointed Style*. Whether this was purely a deviation from the other two modes, or was derived from any foreign source, is not known. It is, however, supposed by some to be of Saracenic origin, and to have been introduced by the Crusaders. This style may be divided into: 1. *Early Complete Gothic*, with its subdivisions of Lancet, and Geometrical Decorated; and 2. *Late Complete Gothic*, with its subdivisions, the Flowing, Flamboyant or Curvilinear Style, and the Perpendicular Continuous Style. The employment of the ogive in place of circular forms in the windows first marks the transition from one of these subdivisions to the other. The perpendicular style is confined to Great Britain; on the continent, 'the Flamboyant Style' was contemporaneous. During the latter part of the sixteenth century, the pointed style assumed the form termed 'the Elizabethan,' or 'Tudor;' in the latter examples of which the Italian is much mingled. The pointed style is distinguished by its numerous buttresses, lofty spires and pinnacles, large and ramified windows with a profusion of ornaments throughout. In the fifteenth and sixteenth centuries the taste for Greek and Roman architecture revived, and brought the five orders again into use: although for sacred edifices the Saxon and Gothic styles still maintain the pre-eminence. Besides those we have mentioned, other styles have been used: thus the Chinese, remarkable for its lightness; the Egyptian, for its vastness. This, as well as the Indian, was most probably derived from the excavations provided by nature as a protection against the sultry heat. Mexican architecture, notwithstanding the enthusiastic praises bestowed by some writers upon it, seems to have been of the rudest character; its temples were little more than vast mounds of earth, sometimes partially faced with stone.

AR'CHITRAVE (*archos*, the chief; and *trapĕx*, a beam: *Gr.*), in Architecture, that part of an order which lies immediately upon the capital of the column, being the lowest member of the entablature. It is sometimes called the *epistylium* (*epi*, upon; and *stulos*, a column: *Gr.*).

AR'CHIVES (probably from *archeia: Gr.*, used by Josephus to signify public registers), ancient records, or charters which contain the titles, pretensions, privileges, and prerogatives of a community, family, city, or kingdom.

AR'CHIVOLT (*arcus volutus*, a turned arch: *Lat.*), in Architecture, the inner contour of an arch, or a frame set off with mouldings, running over the faces of the arch stones, and bearing upon the imposts.

AR'CHON (*archōn*, a ruler: *Gr.*), one of the chief magistrates of the city and commonwealth of Athens. At first the archons succeeded to the kings, and had regal power. Their authority was then divided among nine, and was made annual. In the time of the Romans, the archonship was merely titular and honorary.

ARC'TIC (*arktikos*, near the Bear, northern: *Gr.*), lying under the polar Bear. In Astronomy, the *Arctic* or *North Pole* is that which is raised above our horizon, and is nearly pointed out by the stars in the tail of *Ursa Minor*. The *Arctic circle* is a lesser circle of the sphere, parallel to the equator, and distant 23½° from the north pole. This and the *Antarctic* are often called polar circles.

ARC'TOS, or **ARC'TUS** (*arktos*, the Bear: *Gr.*), in Astronomy, the Greek name for the *Ursa major* and *minor*, or the great and little Bear.

ARCTU'RUS (*arktos*, the Bear; and *ouros*, a guard: *Gr.*), a fixed star of the first magnitude, the α Boötis of astronomers.

ARCUA'TION (*arcuatus*, bent like a bow; *Lat.*), in Horticulture, the raising of trees by layers.——ARCUATION, in Surgery, a distortion or incurvation of the bones.

ARCUBALIS'TA (*arcus*, a bow: *Lat.*; and *ballo*, I hurl: *Gr.*), a cross-bow; a term which has been contracted both into *Balista* and *Arbalist*.

ARDAS'SINES, a very fine sort of Persian silk, the finest used in the looms of France.

A'REA (*Lat.*), in Geometry, the superficial contents of any triangle, quadrangle, or other figure.——AREA, in Mineralogy, the mass dug from the mines, or the place where it is dug.

ARE'CA (*arec: Malab.*), an Indian palm, bearing a nut, of which slices are rolled up in a betel leaf with a little lime, and chewed by the natives. [See BETEL.]

ARE'NA (*Lat.*), in Roman Antiquity, that part of the amphitheatre where the gladiators fought: so called from its being always strewn with sand, to conceal from the view of the people the blood spilt in the combat.

ARENA'TIO (*arena*, sand: *Lat.*), a kind of dry bath, in which the patient sat with his bare feet on hot sand.

ARE'OLA (a *dim.* of *area*; a little space: *Lat.*), one of the small divisions into which a space may be marked out by lines.

AREOP'AGUS (*Areiopagos*: from *Arēs*, Mars; and *pagos*, a hill: *Gr.*), a rocky eminence at Athens, near the Acropolis, upon which a sovereign criminal court held its sittings. The judges were called Areopagites, and through a long period they were greatly respected.

AR'GAND LAMP, so called from the inventor, a Frenchman, is a lamp with a hollow cylindrical wick, supplied with air both inside and outside.

AR'GENT (silver: *Fr.*), in Heraldry, the white colour in the coats of arms of baronets, knights, and gentlemen.

AR'GIL (*argilla*, potter's earth: *Lat.*), in Mineralogy, white clay: an unctuous kind of earth, of which earthenware is made.

ARGILLA'CEOUS EARTH, any earth consisting wholly or in great part of clay.

AR'GOL, a crystalline stony substance, deposited during the fermentation of grape juice. It consists of tartrate of potash and a little tartrate of lime with colouring matter. The tartaric acid of commerce is prepared from it.

AR'GONAUTA AR'GO, the scientific name of the Paper Nautilus, a marine mollusc belonging to the class of Cephalopods, and inhabiting a thin white shell of elegant form. [See NAUTILUS.]

AR'GONAUTS (*Argo*; and *nautēs*, a sailor: *Gr.*), in Grecian Antiquity, a company of illustrious Greeks, who are said to have embarked along with Jason in the ship Argo, on an expedition to Colchis with a design to obtain the golden fleece, a fable to which perpetual allusion is made by Greek and Latin writers. Whether there was any nucleus of fact in the tradition it is impossible to tell.

AR'GO NA'VIS (the ship Argo: *Lat.*), in Astronomy, a constellation, called after the ship of Jason and his companions.

AR'GUMENT (*argumentum*: *Lat.*), in Logic a line of reasoning employed to convince an opponent or one ignorant of the subject. Locke observes that, in reasoning, men ordinarily use four sorts of argument. The first is to allege the opinions of those whose parts and learning, eminence, power, or some other cause, have gained them a name, and settled their reputation in the common esteem, with some kind of authority; this may be called *argumentum ad verecundiam*. A second way is to require the adversaries to admit what they allege as a proof, or to assign a better; this he calls *argumentum ad ignorantiam*. A third way is, to press a man with consequences drawn from his own principles or acts: this is known by the name of *argumentum ad hominem*. A fourth way is the using proofs drawn from any of the foundations of knowledge or probability; this he calls *argumentum ad judicium*, and observes that it is the only one of all the four that brings true instruction with it, and advances us in our way to knowledge.——ARGUMENT, in Literature, the abridgment, or heads of a book, history, chapter, &c.——ARGUMENT, in Astronomy, the angle or quantity on which a series of numbers in a table depends. Thus, in a table showing the amount of horizontal refraction at every degree, &c., of altitude, the altitude would be the argument of the refraction.

ARGUMENTA'TION (*argumentatio*, a reasoning: *Lat.*), in Logic, an operation of the intellect, by which any proposition is proved with the help of other propositions.

A'RIANS, the followers of Arius, a presbyter of Alexandria, who, about A.D. 319, denied the three persons in the Holy Trinity to be of the same essence: affirmed that Christ was a creature inferior to the

Father as to his deity, and neither co-eternal nor co-equal with him; and asserted that the Holy Ghost was formed of the Son. These opinions were revived by Servetus in 1531, and have become prevalent among the disciples of the church founded by Calvin. They were propagated in England in the beginning of the eighteenth century.

A'RIES (the Ram: *Lat.*), in Astronomy, a constellation of fixed stars, drawn on the celestial globe in the figure of a *ram*. It is also the first of the twelve signs of the zodiac, from which a twelfth part of the ecliptic takes its denomination; and the *first point* of Aries coincides with the point at which the ecliptic intersects the equator. Anciently, the signs and constellations coincided; but as, on account of the precession of the equinoxes, the twelve signs go backward among the constellations at the rate of 50′ annually, the first point of Aries is now in the constellation Pisces.—— ARIES was also the original name for the battering ram of the ancients, the striking end of it being frequently made in the shape of a ram's head.

ARIO'SO (graceful: *Ital.*), in Musical Composition, like an air, in contradistinction to recitation. When applied to instruments, it means a sustained vocal style.

ARIS'TA (*arista*, a beard of corn: *Lat.*), in Botany, a long needle-like beard, which stands out from the husk of barley, grass, &c., commonly called the awn.

ARISTOC'RACY (*aristokratia*: from *aristos*, the best; and *krateo*, I govern: *Gr.*), an hereditary government, composed of the nobles or superior citizens of a country: such was the government of Venice. The word aristocracy is also often used to express the nobility of a country, under a monarchy, or any form of government.

ARISTOLO'CHIA (*Gr.*: from *aristos*, best; and *locheia*, childbirth—from its supposed virtues), *Birthwort*, nat. ord. *Aristolochiaceæ*. The species of this genus are for the most part climbers, with curious flowers, inhabiting tropical countries. One species, *A. clematitis*, is indigenous in Britain.

ARISTOTE'LIAN, something relating to Aristotle: thus the Aristotelian philosophy, school, &c. The Aristotelians were also designated Peripatetics, and their philosophy long prevailed throughout Europe, until men perceived that facts could not be discovered by words.

ARITH'METIC (*arithmos*, number: *Gr.*), is the art of computation by numbers. Books of arithmetic contain a body of rules, by which the processes of addition, subtraction, multiplication and division are facilitated, and by which certain other computations desirable for the purposes of business are effected. The method of notation we now use is said to have been obtained from the Arabians: and the characters by which all the operations of common arithmetic are performed are 1, 2, 3, 4, 5, 6, 7, 8, 9, 0. The first nine are called significant figures, or *digits*, which when placed singly denote the simple values belonging to them; but when several digits are placed together, the first or right-hand only is to be taken for its simple value, the second signifies so many tens, the third so many hundreds, and so on. Although this notation consists of only nine digits, with the cipher 0, yet, by giving a local power to these figures, namely, that of units, tens, hundreds, thousands, &c., they may be made to express numbers to an indefinite extent. The Greeks, and other ancient nations, made use of the letters of their alphabets to represent numbers. The Romans followed the same method, but in a simpler form, using I, for One; V, for Five; X, for Ten; L, for Fifty; C, for One Hundred: D, for Five Hundred; and M, for a thousand. Now it is evident that with these seven letters any number may be represented, by repetition and combination: thus XXX stands for three tens, or thirty, CCX for two hundred and ten, and so on. The general rule with regard to the addition and subtraction of these letters is this: when a character of smaller is placed *after*, or on the right hand of, one of a greater value, their values are to be added: thus XVI stands for sixteen. But when it is placed *before*, or on the left hand of, one of greater value, the value of the less is to be taken from that of the greater: thus IV stands for five less one, or four; IX for ten less one, or nine; XC one hundred less ten, or ninety, &c. MDCCCLXIV expresses the year 1864. Arithmetic deals not only with whole numbers, but with broken parts called fractions, of which there are two kinds, Vulgar Fractions, and Decimal Fractions. [See FRACTIONS.]

ARK OF THE COV'ENANT, the chest in which the stone tables of the ten commandments, written by the divine hand, were laid up. The lid of the ark was called the mercy-seat, before which the high-priest appeared once every year on the great day of expiation; and the Jews, wherever they worshipped, turned their faces towards the place where the ark stood.

ARMA'DA, a Spanish term, signifying a fleet of men-of-war. The armada to which the Spaniards, in the confidence of success, gave the name of *invincible*, consisted of 150 large ships, carrying 2,650 guns, 20,000 soldiers, besides volunteers, and 8,000 seamen; it was furnished with an immense quantity of military stores, and was intended to destroy the liberties of this country during the reign of the illustrious Elizabeth; but it was scattered by the elements and almost annihilated by the English fleet, on the 30th of July, 1588. On this occasion, a medal was struck with the motto, 'Afflavit Deus, et dissipantur.' 'God breathed upon them, and they are scattered'

ARMADIL'LA (the *dim.* of *armada*), or GUARDA COSTA, a squadron of men-of-war, formerly maintained on the coasts of Spanish America, to prevent foreigners from trading with the colonists and natives.

ARMADIL'LO (*Dasypus*), a mammalian animal, belonging to Cuvier's family of *Edentata*, of which there are several species, all inhabiting South America. They are covered with a bony case, and most of the species have long tails similarly protected

They are burrowing animals, with nocturnal habits, feeding chiefly on vegetables. Their flesh affords excellent food.

ARME'NIANS, a sect or division amongst the Eastern Christians; thus called from Armenia, the country anciently inhabited by them. There were two kinds of Armenians, one which adhered to the Roman Catholic church, and another which rejected episcopacy. They are generally accused of being Monophysites, allowing only one nature in Jesus Christ.

AR'MIGER (*arma*, arms; and *gero*, I bear: *Lat.*), an esquire, or armour-bearer. Also, one entitled to bear coat-armour. Justice Shallow wrote himself '*armigero*, in any bill, warrant, quittance or obligation.'

ARMIL'LA (a bracelet: *Lat.*), in Antiquity, an ornament for the wrist, presented to soldiers as a badge of distinction.——**ARMILLA MEMBROSA** (a membranous bracelet: *Lat.*), in Anatomy, the circular ligament which surrounds all the tendons of the hand, retaining them as it were in a circle.

ARMIL'LARY SPHERE (last), in Astronomy, an apparatus composed of the principal celestial circles, the equator ecliptic, &c., arranged so as to assist a student to comprehend the facts of astronomy. It revolves on its axis, has a silvered horizon which is divided into degrees, and is movable every way upon a brass supporter.——**ARMILLARY TRIGONOMETER**, an instrument consisting of five semicircles, divided and graduated so as to solve many problems in astronomy.

ARMI'NIANS, followers of Arminius, known as Remonstrants on the continent; a sect of Christians which arose in Holland about the beginning of the 17th century, and separated itself from the Calvinists. Arminius taught against Calvin that men are not predestined by the decrees of God to happiness or perdition in a future state. The Church of England, the Wesleyan Methodists, and other sects, entertain Arminian opinions.

AR'MOUR (*armatura*: *Lat.*), a name for all such contrivances as serve to defend the body from wounds, or to annoy the enemy. Hence it is divided into two kinds, defensive and offensive. A complete suit of *defensive armour* anciently consisted of a casque or helm, a gorget, cuirass, gauntlets, tasses, brassets, cuishes, and covers for the legs, to which the spurs were fastened. This was called armour *cap-a-pie*, and was worn by cavaliers and men-at-arms. The infantry had only part of it, viz. a pot or head piece, a cuirass and tasses; all of them made light. The horses had armour, which covered the head and neck. Of all this furniture of war, scarcely anything is now retained except, in a few cases, the cuirass. *Offensive armour*, or arms, consists of a sword, lance, darts, musket, &c.

AR'MOUR-BEARER, the person who was formerly employed to carry the armour of another.

ARMS (*arma*: *Lat.*), in Military phraseology, all kinds of weapons, whether used for offence or defence.——**ARMS**, in a Legal sense, anything that a person wears for his own defence, or takes into his hand, and uses, in anger, to strike or throw at another.——**COATS OF ARMS**, family insignia or distinctions, which had their rise from the painting of shields practised even in the most ancient times; from the banner borne in war and the tournament; and from the embroidered tunics worn over the armour. Without such contrivances, men cased in armour could not be recognized. In modern times they are placed on carriages, plate &c.

AR'MY (*armée*: *Fr.*), in a general sense, the whole armed force raised for the defence of a country by land. In a limited sense, it denotes a large body of soldiers consisting of horse and foot, completely armed and provided with artillery, ammunition, provisions, &c., under a commander-in-chief, having lieutenant-generals, major-generals, brigadiers, and other officers under him. An army is generally divided into a certain number of corps, each consisting of brigades, regiments, battalions, and squadrons. When in the field it is formed into lines; the first line is called the vanguard, the second the main body, the third the rear guard, or body of reserve. The middle of each line is occupied by the foot; the cavalry forms the right and left wing of each line, and sometimes squadrons of horse are placed in the intervals between the battalions.——The *matériel* of an army, as the French term it, consists of the horses, stores, provisions, and everything necessary for service.

ARO'MA (any spice: *Gr.*), the odoriferous principle peculiar to plants and flowers.

AROMAT'IC (last), an appellation given to such plants and other bodies as yield a brisk fragrant smell, and a warm spicy taste, as cloves, cardamom-seeds, cinnamon, nutmegs, &c. The peculiar qualities of aromatic plants reside in a volatile oil, usually called essential oil, and in a grosser resinous substance, capable of being extracted by spirit of wine. *Aromatics*, considered as medicines, warm the stomach, and by degrees the whole habit, raise the pulse, and quicken the circulation: hence, in cold languid cases, they increase strength and promote the natural secretions.

ARPEG'GIO (*arpeggiare*, to play the harp: *Ital.*), in Music, a term implying that the tones should be sounded distinctly, as they are heard on the harp.——**ARPEGGIO ACCOMPANIMENT**, one that consists chiefly of the notes of the several chords, taken in returning successions.

AR'PENT, an old French measure of 100 perches.

AR'QUEBUS (*Fr.*), an ancient hand-gun, larger than a musket. He who used it was called an *Arquebusier*.

ARQUEBUSA'DE (last), an aromatic spirituous lotion, used with sprains and bruises, but originally intended for wounds inflicted with an arquebus.

ARRA'CHE' (*arracher*, to snatch: *Fr.*), in Heraldry, the representation of a plant torn up by the roots.

ARRA'CK, an East Indian name for an ardent spirit distilled from rice, palm-juice, and other matters.

ARRAIGN'MENT, in Law, the bringing a prisoner forth, reading the indictment to him, and putting the question of guilty or not guilty.

AR'RAS HANG'INGS, tapestry made at Arras, in France, or tapestry of similar design.

ARRAY' (order: *Old Fr.*), the drawing up of soldiers in order of battle.——In Law, *to challenge an array* is to make exceptions against all the persons arrayed or empanneled as a jury.

ARREST' (*arrêter*, to stop: *Fr.*), the apprehending and restraining a person which in all cases, except treason, felony, or breach of the peace, must be done by virtue of a warrant from some court, or some person authorized to grant it. Ambassadors, peers of the realm, and members of parliament are privileged from an arrest in civil cases, as also barristers and attorneys when attending the courts. When a defendant is already in one of the prisons of the superior courts, a writ of *detainer* will continue such imprisonment at the suit of a new plaintiff.——ARREST OF JUDGMENT, is the assigning just reasons why judgment should not pass; as, want of notice of the trial; a material defect in the pleading; when the record differs from the deed pleaded; where more is given by the verdict than is laid in the declaration, &c. This may be done either in criminal or civil cases.——ARREST, in the Veterinary art, a disease seated between the ham and the pastern.

ARRIE'RE BAN (*arrière*, rear; and *ban*, a convening of those who held immediately from the king: *Fr.*), the phrase for a general proclamation of the French kings, by which not only their immediate feudatories, but their vassals, were summoned to take the field, in war.——An *arrière vassal* was the vassal of a vassal.

AR'RIS (*arisan*, to arise: *Sax.*), in Architecture, the intersection or line formed by the meeting of the exterior surfaces of two bodies, answering to what is called the edge.——ARRIS FILLET, a small piece of timber, of a triangular section, used in raising the slates against a wall that cuts obliquely across the roof.

ARRON'DE'E (*arrondir*, to round: *Fr.*), in Heraldry, a cross, consisting of segments of a circle, the whole of the curves being in the same direction, so that its arms are not of different widths at different parts.

AR'ROW (*arwe: Sax.*), a light shaft, or rod, pointed at one end, and feathered at the other, intended as a weapon of offence. Arrow-makers were called *fletchers* (from *flèche*, the French word for *arrow*). When the arrow is borne in coats of arms, it is said to be barbed and feathered.

AR'ROW-GRASS, marsh plants belonging to the genus *Triglochin*, nat. order, *Juncaginaceæ*, so called because their leaves resemble the head of an arrow. There are two species in Britain.

AR'ROW-ROOT, a nutritive fecula, obtained from the tuberous roots of several exotic plants. The West Indian arrowroot is obtained from species of *Maranta*, chiefly *M. arundinacea*; East Indian from *Curcuma leucorhiza*. The root is simply grated, and the starch freed from impurities by repeated washing.

AR'ROW-STICK, a rod employed in surveying.

ARSE'NIATE, a salt formed by the combination of arsenic acid with a base; as the arseniate of ammonia, &c.

AR'SENIC (*arsenikon*, yellow orpiment: *Gr.*), a brittle metal, of an iron-grey colour; its specific gravity is 5·7. It volatilizes at 365° Fahr., with the odour of garlic. Like its compounds it is highly poisonous. It is found associated with many other substances; but it is usually obtained as *realgar*, or *orpiment*, which are both sulphurets, and, when prepared artificially, are used as red and yellow paints. White oxide of arsenic or arsenious acid is the arsenic of which we hear in poisoning cases. The best antidote for arsenic is expelling it as quickly as possible by emetics or the stomach-pump, and administering the hydrated peroxide of iron in plentiful doses.

AR'SON (*arsum*, to burn: *Lat.*), the act of wilfully setting houses on fire, which is felony at common law, and likewise by statute.

ART (*ars: Lat.*), a system of rules, serving to facilitate the performance of certain actions; in which sense it is opposed to *science*, or a system of principles.——Such words as are used in any particular art, profession, or science, are called *terms of art*, or *technical terms*.

ART AND PART, a phrase used in Scotland. When anyone is charged with a crime, they say he is *art and part* in committing it: that is, he was concerned both in the contrivance and execution of it.

ARTEMI'SIA (*Gr.*: from *Artemis*, Diana), in Antiquity, a festival celebrated in honour of Diana.——In Botany, a genus of composite plants, in which southernwood, wormwood, and tarragon, are contained.

AR'TERY (*aër*, the air; and *têreo*, I keep: *Gr.*—see AORTA), a blood-vessel which proceeds from the heart, and gradually becomes less in diameter the farther it goes; but it gives out numberless ramifications in its course. Arteries carry the blood from the heart to every part of the body. The action of the arteries, called the pulse, corresponds to that of the heart.

ARTE'SIAN WELL, a well bored to a considerable depth, until it reaches a subterranean basin. The water then rises up the bore in consequence of the hydrostatic pressure, and in some cases will spring into the air from the mouth of the well. It is said that Artesian wells derive their name from the ancient French province of Artois where for many centuries they have been used, although their adoption in this country is very recent. In London and its vicinity there are now a great many of these wells, which have been perforated through the immensely thick bed of London clay, and even through some portions of the subjacent chalk. The fountains in Trafalgar Square are supplied by an Artesian well 400 feet deep, and from another one of the same depth is drawn the water required for the Horticultural Gardens at South Kensington. The Artesian well at Grenelle, near Paris, is 1,798 feet deep: it affords 881,884 gallons of pure water in the twenty-four hours. The water rises to a considerable height above the surface of the ground. The temperature of the water as it escapes is 81°. A well at Passy, near Paris, is 1,925 feet deep, and affords upwards of four millions of gallons per diem, sufficient for the wants of a population of 500,000. The cost was about 39,000*l.*

ARTHRI'TIS (*Gr.*), the *gout*, which see.

ARTHRO'DIA (*arthron*, a joint: *Gr.*), in Anatomy, a species of articulation, in which the flat head of one bone is received into the shallow socket of another.

ARTHUR, the chief hero of British chivalrous romance. He was said to be the son of Pendragon, the last British king who defended England against the Anglo-Saxons. His wife was named Genevra, or Guinevere. He, and his twelve knights, called peers, sate at the Round Table which he instituted. Of these knights the most famous were Sir Tristan of the Lyonnese, Lancelot of the Lake, Galaar his son, Percival of Wales, and Gawin the king's nephew. Merlin the enchanter was a leading personage at the king's court.

AR'TICHOKE (*kharciof: Arab.*), a composite plant, the *Cynara Scolymus* of botanists. The fleshy bases of the scales of the involucre are eaten. The Jerusalem Artichoke, called *Helianthus tuberosus* by botanists, is a member of the same order. It is the root of this plant that is eaten. Its common name is a corruption of the Italian word Girasole, a name given to it because it was supposed that it, or some of its congeners, turned with the sun.

AR'TICLE (*articulus*, literally a small joint: *Lat.*), in Grammar, a particle in most modern languages, that serves to mark the several cases and genders of nouns, when the languages have not different terminations to denote their different states and circumstances.——ARTICLE, in Law, a clause or condition in a covenant. ——ARTICLE, in Zoology and Botany, a joint.

AR'TICULATA (same *deriv.*), a sub-kingdom or province of the Animal Kingdom, which is divided into five classes: 1. CRUSTACEA (Crabs, lobsters &c.) 2. ARACHNIDA (SPIDERS and their allies) 3. INSECTA (Flies, bees, beetles, butterflies, moths, &c.) 4. ANNELIDA, or ANNULATA (Worms). 5. ENTOZOA (Intestinal worms).

ARTICULA'TION (*articulatio*, from *articulo*, I divide into joints: *Lat.*), in Anatomy, the junction of two bones intended for motion. There are two kinds of articulation; the *diarthrosis*, which has a manifest, and *synarthrosis*, which has only an obscure motion.——Also, the distinct utterance of every letter, syllable, or word, so as to make oneself intelligible.

ARTIF'ICER (*artifex*: from *ars*, an art; and *facio*, I make: *Lat.*), one who works with the hands, and manufactures any kind of commodity in metal, wood, &c.; a mechanic.

ARTIFI'CIAL DAY, in Astronomy, that space of time which intervenes between the rising and setting of the sun.

ARTIFI'CIAL LINES, in Geometry, lines so marked on a sector as to represent logarithmic lines and tangents.

ARTIL'LERY (*artillerie: Fr.*), a collective name denoting all kinds of missiles used in war, with the machines for propelling them, but particularly cannon, mortars, and other large pieces for the discharge of shot and shell. The science of artillery teaches whatever relates to the construction of all engines of war, the arrangement, movement, and management of cannon and all sorts of ordnance, used either in the field, or the camp, or at sieges, &c. The same name is also given to the troops by whom these arms are served, the men being, in fact, subsidiary to the instruments.——*Park of artillery*, a place set apart in a camp for the artillery and large firearms.——*Train of artillery*, a set or number of pieces of ordnance mounted on carriages. ——*Flying artillery*, a sort of artillery, so called from the celerity with which it can be moved. Seats are contrived for the men who work it, and a sufficient force of horses is applied to enable them to proceed at a gallop.

AR'TIST (*artiste: Fr.; from ars*, an art: *Lat.*), a proficient in the liberal arts, in distinction from *artisan*, or one who follows one of the mechanic arts.

ARTS (*ars*, an art: *Lat.*), are usually divided into the *fine* and the *useful*: the former comprising all those of which the direct object is not absolute utility, as painting, sculpture, music, poetry, &c.; and the latter such as are essential to trade and commerce. The ancients divided them into the *liberal* and the *servile*: the former being considered as belonging to freemen, and the latter to slaves.

ARUM, a common English herbaceous plant, the root of which yields a starch known as Portland sago. It belongs to the nat. ord. *Araceæ*, or *Aroideæ*, characterized by having the male and female flowers growing upon a central shaft or spadix, and surrounded by a sheath called a spathe. The beautiful Lily of the Nile belongs to this order. The roots of some species belonging to the genera *Caladium* and *Colocasia* are common articles of food in hot countries, and form the *taro* (*kalo* according to Seemann) of the South Sea Islanders. In tropical Brazil there are groves of arborescent *Caladia*, from 12 to 15 feet high, and having woody stems from 8 to 10 inches in diameter.

ARUNDE'LIAN MAR'BLES, a collection of ancient statues, busts, altars, and inscribed stones, found, in the early part of the 17th century, by Thomas Howard, Earl of Arundel, a great lover of the arts, who died in 1646. The collection when complete consisted of 37 statues, 128 busts, and 250 inscribed marbles, besides altars, sarcophagi, and some fine gems (the Marlborough gems of the present day), and these were placed in Lord Arundel's house in the Strand. After his death the collection was dispersed: part was purchased by Lord Pembroke, and is now at Wilton; another part went into the possession of the present Lord Pomfret's family, and ultimately found their way to Oxford. The inscribed marbles which had descended to a grandson of Lord Arundel, were by him presented to the University of Oxford. After Selden's collection had been added to them, the inscriptions were published with annotations. The most interesting of the inscribed stones is that called the Parian Chronicle, from its being supposed that it was made in the island of Paros, B.C. 263.

ARUS'PICES, or HARUS'PICES (*haruspex*, a soothsayer: *Lat.;* probably from *hira*, the empty gut, or jejunum; and *spicio*, I behold: *Lat.*), an order of priests among the Romans, who pretended to foretell events by inspecting the entrails of victims killed in sacrifice. They derived their name from looking on the entrails, being called also, for the same reason, *exti spices* (ab extis inspiciendis). The tradition ran that they had been instituted by Romulus.

AR'VIL, or AR'VAL, in English Archæology, funeral rites.——ARVIL BREAD, bread given to the poor at a funeral.

ARYAN (*Sanskrit*), a term applied in Philology to a family of languages, otherwise termed Indo-European, embracing Sanskrit, Greek, Latin, Gothic, Celtic, and Slavonic. It is conjectured that there was an ancient people, the Aryans, of whose tongue these various languages are corruptions.

AS (*Lat.*), a weight used by the ancients, consisting of 12 ounces, and very nearly equal to our pound.——Also, a brass coin, which originally weighed an *as*, but was ultimately reduced to half an ounce: its value was about three farthings English money.——Also, an integer divided into twelve parts. 'Ex asse hæres,' the heir to the whole estate.

ASBES'TOS (inextinguishable: *Gr.*), a mineral which has a fibrous structure [see AMIANTHUS]. The ancients made an incombustible cloth from asbestos, for the purpose, it is said, of wrapping up the bodies of the dead when placed on the funeral pile, that their ashes might be collected free from mixture with those of the combustibles employed. A rock has been found in Western Australia, of which asbestos forms a principle ingredient, and this renders it so soft that it may be cut into any shape with an axe.

ASCAR'IDES (*Gr.*), the plural of *Ascaris*, the name of a genus of entozoa, of which some species infest the human body.

ASCEN'DANT (*ascendo*, I ascend: *Lat.*), in Law, such relations as are nearer the root of the family; as the father, grandfather, great-uncle, &c. Marriage is always forbidden between the ascendants and descendants in a right line.——ASCENDANT, in Astrology, that degree of the ecliptic that rises at a person's nativity; or the planet supposed by astrologers to preside over the fate of an individual at his birth.——ASCENDANT, in Architecture, an ornament in masonry or joiner's work, which borders the three sides of doors, windows, and chimneys.

ASCEND'ING (same *deriv.*), in Astronomy, an epithet applied to any star, degree, or point in the heavens, which is rising above the horizon.——ASCENDING LATITUDE, the latitude of a planet when going towards the north pole.——ASCENDING NODE, that point of a planet's orbit, at which it passes the ecliptic to proceed northward.——ASCENDING SIGNS, those eastward from the meridian, that is, approaching the meridian on account of the diurnal rotation.

ASCEN'SION (*ascensio*, from same *deriv.*), an astronomical term. The *right ascension* of a star is the arc of the equinoctial included between a certain point called the vernal equinox and the point cut by the circle of declination of that star. The right ascension (R.A.) and declination (N.P.D.) of a star correspond to the longitude and latitude of a place on our globe. The right ascension of a star is determined by observing the moment of its passage across the meridian by a clock regulated to exact sidereal time.

ASCEN'SION-DAY (same *deriv.*), a festival observed in the Christian church, on a Thursday, ten days before Whitsuntide, in commemoration of Christ's ascent into heaven.

ASCET'ICS (*asketikos*, industrious; from *askeo*, I exercise: *Gr.*), in Ecclesiastical History, such Christians as inured themselves to great degrees of abstinence and fasting, in order to subdue their passions; following the system of the Essenes and Therapeutæ among the Jews. They had their origin in Egypt and Syria. They seem to have supposed that mortification of the body, even though equivalent to slow suicide, is the perfection of religion.

ASCID'IANS (*askidion*, the *dim.* of *askos*, a wine-skin: *Gr.*), in Zoology, a tribe of marine molluscs, belonging to the class of TUNICATA. In place of a shell they have an elastic bag, like a coat or tunic, by the base of which they are attached to rocks. Into this sac there are two openings, one branchial, the other anal. These animals sometimes grow to the length of several inches.

AS'CII (*askioi;* from *a*, without; and *skia*, shadow: *Gr.*), in Geography, inhabitants of the globe who, at certain times, have no shadow: such as those in the torrid zone, who twice a year have the sun vertical at noon.

ASCI'TES (*askites*, from *askos*, a wine-skin: *Gr.*), in Medicine, dropsy in the region of the abdomen.

ASCLEPIADA'CEÆ (from *Asclepias*, the name of one of the genera), an order of plants with monopetalous flowers growing chiefly in Africa. They are remarkable for abounding in milky juice, and for the curious structure of the anthers and stigma, which are consolidated into a column. A kind of silky cotton is attached to the seed.

The plants of this order are not possessed of many useful properties; but some of the genera (Hoya, Stapelia, Stephanotis, &c.) are conspicuous in our hot-houses for their beautiful or curious flowers.

ASH (*ac*, a point: *Celt.*), a well-known English tree, whose wood is much used by wheelwrights, turners, &c. It is the *Fraxinus excelsior* of botanists: nat. ord. *Oleaceæ*. The mountain-ash is a small tree, bearing bunches of red pomes, which are very ornamental in autumn. It is called *Pyrus aucuparia* by botanists, and is allied to the apple and pear: nat. ord. *Rosaceæ*.

ASH-WED'NESDAY, the first day in Lent, so called from the ancient custom of fasting in sackcloth and ashes.

ASH'LAR MAS'ONRY (*asciare*, to chip: *Ital.*), in Architecture, consists of blocks of stone cut to rectangular or other regular figures, and laid in courses of uniform depth.

ASHO'RE, a term for 'on the shore or land,' as opposed to *aboard;* but a ship is said to be *ashore* when she has run aground.

ASI'DE, a term in plays for what is supposed to be said on the stage without being heard by the other performers.

ASI'LUS (the horse-fly: *Lat.*), in Entomology, a genus of dipterous insects which prey on other insects. Several of the species are natives of Britain.

ASP (*aspis*, a shield: *Gr.*, because it coils itself up so as to resemble a circular shield), a venomous serpent, the *Naja haje* of naturalists, a native of Lybia and Egypt, where it was formerly considered sacred, and the emblem of divinity. Its bite is very deadly, and yet the serpent charmers make use of it in their performances. It is supposed to have been the instrument of Cleopatra's death. The fatal cobra de capello belongs to the same genus.

ASPAR'AGUS (*asparagos: Gr.*), a well-known plant, the young shoots of which are eaten. It belongs to the order of *Liliaceæ*.

AS'PEN-TREE, a species of poplar, the *Populus tremula* of botanists. The shaking of its leaves with the slightest motion of the air is well-known.

ASPHAL'TUM (*asphaltos: Gr.*, from its use as a cement), a bituminous substance, found in abundance in different countries, especially near the Dead Sea, and in Albania; but nowhere in such quantities as in the island of Trinidad, where there is a large plain of it, called the Tar Lake, which is three miles in circumference, and of an unknown depth. It is also found in France, Switzerland, and in some other parts of Europe. This substance, which is also called mineral pitch and compact bitumen, has no regular structure, and breaks easily in any direction. It is a little heavier than water, melts easily, is highly inflammable, and burns with a red smoky flame. It is a compound of carbon, hydrogen and oxygen. The ancients employed asphaltum in the construction of their buildings.

AS'PHODEL (*asphodelos*, the daffodil: *Gr.*), a plant celebrated by the ancient poets, belonging to the lily order. There are several species, most of which are natives of Europe.

ASPHYX'IA (*asphuxia:* from *a*, without; and *sphuxis*, pulsation: *Gr.*), in Medicine, a stoppage of the power of respiration. If a person's throat were accidentally stopped up by the introduction of some foreign substance, and he were to die in consequence, it would be a case of death by asphyxia.

AS'PIRATE (*aspiratio*, from *aspiro*, I breathe on: *Lat.*), in Grammar, a character in the Greek marked thus (ʽ), denoting that *h* is to be sounded before the letter to which it is prefixed. In English, the letter *h* is called aspirate, when it is sounded, in distinction from *h* mute.

ASS (*asinus: Lat.*), a well-known animal, remarkable for its hardihood and length of life. It is said to be a descendant of the wild ass, inhabiting the mountainous deserts of Tartary, &c., celebrated in history for the fiery activity of its disposition, and the fleetness of its course. Its characteristics are a long head, long ears, a round body covered with a short and coarse fur, of a pale dun colour, with a streak of black running down its back and across the shoulders, and a tail not hairy all the way, as in a horse, but only at the end. The best breed of asses is that originally derived from the hot and dry regions of Asia; but the best to be met with in Europe are the Spanish.

ASSAFŒ'TIDA (*fetidus*, stinking: *Lat.*), a resinous gum of a very fetid smell, obtained from the *Ferula Assafœtida*, a perennial umbelliferous plant, a native of Persia. It comes into this country in small grains of different colours, hard and brittle, and is employed medicinally as a stimulant and antispasmodic.

ASSA'I (enough: *Ital.*), a Musical term, which indicates that the time must be reasonably accelerated or retarded; as *allegro*, quick; *allegro assai*, still quicker; *adagio assai*, still slower.

ASSAS'SIN (*haschischa*, henbane: *Arab.*), which was used by such persons to produce excitement), one who kills another, not in open combat, but privately or suddenly.

ASSAULT' (*assaut: Fr.;* from *assilio*, I spring upon: *Lat.*), in Law, an attempt or offer, with force and violence, to do a bodily injury to another, as by striking at him either with or without a weapon.——ASSAULT, in the Military art, a furious effort made to carry a fortified post, camp, or fortress, in which the assailants do not screen themselves by any works.

ASSAY' (*essayer*, to try: *Fr.*), in Metallurgy, is used to express those chemical operations which are made in small to ascertain the quantity of metal contained in ores, or to discover the value or purity of any mass of gold, silver, or other metal. This mode of examination differs from *analysis*, in being principally concerned about only one of the ingredients in the ore or alloy, whereas the object of the latter is to ascertain the quantity and proportion of every substance in the mass to which it is applied.

ASSAY'-MASTER, an officer of the Mint,

whose duty it is to make *assay* of the gold and silver.

ASSENT' (*assentio*, I agree with: *Lat.*), (THE ROYAL), is the approbation given by the sovereign in parliament to a bill which has passed both houses; after which it becomes a law. The formal words by which this assent is expressed are in Norman-French. If it is a bill of supply, the words are 'Le Roi (or la Reine) remercie ses loyaux sujets accepte leur benevolence et ainsi le veut.' If it is a public bill, not being a bill of supply, 'Le Roi le veut,' and if a private bill, 'Soit fait comme il est desiré.'

AS'SETS (*assez*, enough: *Fr.*), in Law, signifies goods or property in the hands of the heir, devisee, executor, or administrator, of a deceased person, chargeable with the payment of debts and legacies. It has been extended to all property which can be made available to satisfy a man's liabilities.

AS'SIDENT SIGNS (*assideo*, I attend: *Lat.*), in Medicine, symptoms which occasionally attend any disease incident to the human frame.

ASSIGN'ABLE MAG'NITUDE (*assigno*, I assign: *Lat.*), in Mathematics, any finite magnitude that can be expressed or specified.

ASSI'GNAT (*Fr.*), the name of the national paper currency in France during the Revolution. Four hundred millions of this paper money were first struck off by the constituent assembly, with the approbation of the king, April 19, 1790, to be redeemed with the proceeds of the sale of the confiscated goods of the church, &c. They at length increased, by degrees, to forty thousand millions, and after a while they became of no value whatever.

ASSIGNEE' (*assigno*, I assign to: *Lat.*), in Law, a person to whom something is made over. One to whom is committed the management of a bankrupt's estate.

ASSI'GNMENT (same *deriv.*), in Law, the act of assigning or transferring the interest or property a man has in a thing, or of appointing and making over a right to another, and the formal instrument by which the act is made evident.

ASSIMILA'TION (*assimilatio*, from *assimilo*, I make like to: *Lat.*), that process in the animal economy by which the different ingredients of the blood are made parts of the various organs of the body.

ASSI'ZES (sessions: *Nor. Fr.*), a meeting of the king's judges, the sheriff, and juries, for the purpose of making gaol deliveries, and trying causes between individuals; in some places held eight times a year. The assizes are *general* when the justices go their circuits, with commission to take all assizes, that is, to hear all causes; and they are *special* when special commissions are granted to hear particular causes.

ASSOCIA'TION OF IDE'AS (*associo*, I unite with: *Lat.*). By this phrase is understood that connection between certain ideas which causes them to succeed each other involuntarily in the mind. To the wrong association of ideas made in our minds by custom, Locke attributes most of the sympathies and antipathies observable in men, which work as strongly, and produce as regular effects, as if they were natural, though they at first had no other origin than the accidental connection of two ideas, which, either by the strength of the first impression, or by subsequent indulgence, are so united, that they ever after keep company together in the mind, as if they were but one idea.

ASSO'DES (loathsome: *Gr.*), in Medicine, a fever with excessive inward heat, though not so great externally.

ASSOI'LE (*absoudre*, I absolve: *Fr.*), in our ancient Law-books, to absolve, free, or deliver one from excommunication.

AS'SONANCE (*assono*, I answer by sound: *Lat.*), in Poetry, is where the terminating words of the verses have the same vocalic sounds, but different consonants, so that there is no proper rhyme. Spanish poetry abounds with assonant verses.

ASSUMP'SIT (*assumo*, I take up: *Lat.*), in Law, an implied promise to pay for work or goods, such as will sustain an action.

ASSUMP'TION (*assumptio*, *from same deriv.*), a festival in the Roman Catholic Church, kept on the 15th of August, in honour of the alleged miraculous ascent of the Virgin Mary into heaven.——ASSUMPTION, in Logic, is the minor or second proposition in a categorical syllogism. Also, the consequence drawn from the propositions of which an argument is composed.

ASSUMP'TIVE ARMS (same *deriv.*), in Heraldry, such arms as a person has a right to assume to himself by virtue of some action, provided his right be confirmed by the approbation of his sovereign and the heralds. Also, armorial bearings improperly assumed.

ASSU'RANCE. [See INSURANCE.]

AS'TER (*astēr*, a star: *Gr.*), a genus of ornamental plants belonging to the *Compositæ*.

AS'TERISK (*asteriskos*, from same: *Gr.*), a little star (*) used in Printing as a mark of reference.

AS'TERISM (*astēr*, a star: *Gr.*), in Astronomy, a constellation of fixed stars.

A'STEROI'DS (*astēr*, a star; and *eidos*, form: *Gr.*), the small planets that circulate between the orbits of Mars and Jupiter. The first discovery took place in 1801. About eighty are now known, and new discoveries are being continually made. They are conjectured to be the ruins of a large planet, shattered by some explosion. They are so small that their magnitudes cannot be ascertained with certainty; but it is thought that their total mass is quite insignificant. In only two can disks be perceived by careful examination with very powerful telescopes. 'A man placed on one of them (says Sir John Herschel) would spring with ease sixty feet high, and sustain no greater shock in his descent than he does on the earth from leaping a yard. On such planets giants might exist, and those enormous animals which on earth require the buoyant power of water to counteract their weight might there be denizens of the land.'

AS'THMA (*Gr.*), a disease of the lungs, causing paroxysms of laborious breathing.

AS'TRAGAL (*astragalos*, the ankle-bone: *Gr.*), in Architecture, a little round moulding in form of a ring, serving as an ornament at the top and bottom of columns.——ASTRAGAL, in Gunnery, the corner ring of a piece of ordnance.

ASTRA'GALUS (same *deriv.*), in Anatomy, the ankle-bone.——ASTRAGALUS, in Botany, *Liquorice-Vetch*, the seed of which resembles in shape the ankle-bone. It belongs to the *Leguminosæ*.

ASTRIC'TION (*astringo*, I bind: *Lat.*), the operation of astringent medicines.

ASTRIN'GENTS (same *deriv.*), medicines which cause the fibres of the muscles and blood-vessels to contract. Hence they diminish the flow of the fluids, and are employed to give tone, lessen glandular secretions, stop the flow of blood from a ruptured vessel, &c. Mineral acids, metallic salts, tannin, and gallic acid, are amongst the astringents commonly employed.

AS'TROLABE (*astron*, a star; and *lambano*, I take: *Gr.*), an instrument formerly used for observing the stars. It consisted of two or more graduated circles, having a common centre, but so inclined to each other, that the astronomer might observe in the planes of different circles of the sphere. Its place is now supplied by the equatorial, theodolite, &c. Ptolemy reduced its form to a plane surface, which he called a *planetarium*.

ASTROL'OGY (*astron*, a star; and *logos*, a discourse: *Gr.*), originally meant the same thing as astronomy: but for a long time, under the name of *judicial* astrology, it has been used to designate an art which may truly be said to be among the oldest superstitions of the world, and which consisted in judging or predicting human events from the situation and different aspects of the heavenly bodies. It is mentioned in the Mosaic history; and we know that those who professed the astrological art, gave so much trouble at Rome, that they were at length banished by Tiberius. During the middle ages, astrology and astronomy were cultivated in connection by the Arabs, and their works on the subject are still extant. Nay, even so late as the 17th century, astrology had its defenders among the learned men of Europe; but the Copernican system shook the foundations of this ancient science, and, at the present day, there are none but artful plunderers and ignorant dupes who give it the slightest countenance.

ASTRON'OMY (*astronomia;* from *astron*, a star; and *nomos*, a law: *Gr.*) that science which treats of the heavenly bodies, explaining the motions, times and causes of the motions, distances, magnitudes, gravities, light, &c., of the sun, moon, and stars; the nature and causes of the eclipses of the sun and moon, the conjunction and opposition of the planets, and any other of their mutual aspects, with the times when they did or will happen. Since the heavens may be considered either as they appear to the naked eye, or as they are discovered by the understanding, Astronomy may be divided into Practical, Rational, and Physical. *Practical* Astronomy enables us, by means of instruments, to determine the apparent positions and motions of the heavenly bodies. *Rational* Astronomy teaches us the modes of ascertaining their real orbits and motions, and gives us the means of calculating their positions in advance. Various hypotheses have at different periods been invented to explain their apparent motions, and seemed sufficient to account for the phenomena known at the time of their adoption. But they were exploded in succession, by more accurate observations. *Physical* Astronomy is the application of mathematical science to the investigation of the laws which regulate the motions of celestial bodies, the nature of the forces which maintain them, and the effects produced by the action of one on another. This sublime science is founded on observation, but it receives its last perfection from calculation. Outrunning the cautious advances of observation, it descends from causes to phenomena, and on philosophical principles explains all the motions, magnitudes, and periods of revolution of the heavenly bodies. It is not within the scope of this work, however, to enter into the details of this science: but we shall briefly notice the most striking portions of its history. The generality of writers agree in assigning the origin of Astronomy to the Chaldeans soon after the deluge. For the purpose of making their astrological predictions, to which they were much addicted, as also for that of advancing the science of Astronomy, they devoted themselves to the study of the heavenly bodies. They discovered their motions and peculiar characters, and, from their supposed influence on human affairs, pretended to predict what was to come. The Egyptians also cultivated the science of Astronomy about the same time, and there are some who ascribe to them the honour of being its real authors. The most ancient astronomical observations known to us are Chinese: one, mentioned by Montucla, viz. a conjunction of Saturn, Jupiter, Mars, Mercury, and the Moon, was made almost 2,500 years before the Christian era! That the Indian Brahmins also made considerable advances in the science of Astronomy, among the earliest people of antiquity, appears no less certain. But, in the obscurity of ancient history, it is no easy task to determine to what nation the merit is actually due. Descending, however, to classic times, we find that Astronomy made great progress in Greece, and that Thales calculated a solar eclipse about 600 years B.C. Pythagoras also seems to have been possessed of very considerable astronomical knowledge. He taught that the earth was not placed as the centre of the system, but revolved about the sun. After him, the Athenian Meton (B.C. 432) introduced the famous lunar cycle of 19 years, at the end of which time the new moon appears on the same day of the year as at the beginning of it, since 19 solar years constitute very nearly 235 lunations, a discovery which was then regarded as so important that the calculation was engraved in letters of gold, whence the number which marks the year of the cycle is still called *golden*. Eratosthenes, a Cyrenian, who was born 276 B.C., measured the circumference of the earth; and, being invited to the court of Ptolemy Euergetes at Alexandria, he was made keeper of the royal library, and set up there the armillary spheres which Hipparchus and Ptolemy afterwards used so effectually. He also determined the distance between the tropics to be $\frac{11}{166}$ of the whole meridian circle, which makes the obliquity of the ecliptic in his time to be 23 degrees, 51 minutes and one-third. Archimedes is said to have constructed a planetarium to represent the phenomena and motions of the heavenly bodies; and many others added to the stock of astronomical knowledge; but none so much as Hipparchus, who flourished about 140 years B.C., and surpassed all who had gone before him in the extent of his researches. He showed that the orbits of the planets are eccentric, and that the moon moves more slowly in her apogee than in her perigee. He constructed tables of the motions of the sun and moon; collected accounts of eclipses that had been computed by the Chaldeans and Egyptians, and calculated such as would happen for six hundred years to come; besides correcting the errors of Eratosthenes in his measurement of the earth's circumference, aad computing the sun's distance more accurately. He is, however, most distinguished by his catalogue of the fixed stars to the number of a thousand and eighty, with their latitudes and longitudes and apparent magnitudes. These and most other of his observations have been preserved by his illustrious successor Ptolemy. From the time of Hipparchus, a chasm exists in the history of Astronomy, till the commencement of the 2nd century after Christ, when Ptolemy compiled a complete system of Astronomy, in 13 books, which is known under the name of *Almagest*, an appellation given it by the Arabians, who translated it into their language in 827, and which, as the Ptolemæan system, notwithstanding its many errors, has maintained its value down to the latest times. The Arabians continued for many ages to direct their attention to astronomical science; and though they confounded it with the dreams of astrologers, they, nevertheless, deserve the regard of all who came after them, by their valuable observations. Among the Christian nations at this period a profound ignorance generally prevailed; but in the 13th century Astronomy, as well as other arts and sciences, began to revive in Europe, particularly under the auspices of the emperor Frederic II., who, besides restoring some decayed universities, founded a new one, and in 1230 caused the works of Aristotle and the Almagest of Ptolemy to be translated into Latin. King Alphonso of Castile, about the same time, invited to his court several astronomers, and commissioned them to prepare a set of new astronomical tables, which, under the name of *Alphonsine Tables*, have acquired much celebrity, but which in the 17th century differed a whole degree from the true situations of the celestial bodies. We now approach the era of reviving science. Many astronomers of inferior note paved the way, by various insulated observations, for the great restorer of Astronomy, Copernicus, who, at the beginning of the 16th century, gave the science an entirely different aspect, exploded the Ptolemæan hypothesis, and in its stead substituted the Copernican system of the world, which, with a few modifications, is now universally acknowledged to be correct. He it was who gave the sun its place in the centre of the planetary system, and who first conceived the bold idea that the earth is a planet, like Mercury, Venus, and the rest, and moves, in common with them, in an orbit round the sun. His system did not, however, immediately meet with a general reception; and among its opponents was Tycho Brahe, a Dane, who asserted that the earth is immovable, in the centre of the universe, and that the whole heavens turn round it in 24 hours: an opinion which he supported principally by the literal sense of various passages in the Bible, where a total absence of motion is ascribed to the earth. His pupil and assistant, Kepler, however, found that all the planets revolve in elliptical orbits, in one of the foci of which the sun is placed; and he moreover demonstrated that, in each elliptical revolution of the planets round the sun, an imaginary straight line, drawn from the latter to the former, called the *radius vector*, always describes equal areas in equal times, and, lastly, that in the revolutions of the planets and satellites, the squares of the times of revolution are as the cubes of the mean distances from the larger body. These great discoveries paved the way for views still more comprehensive. Kepler had been indulged with a faint glimpse of the mutual tendency of all bodies to one another; and Dr. Hook went so far as to show that the motions of the planets are produced by the attractive agency of the sun, combined with the force which had originally projected them. But it was reserved for Newton to establish the law of universal gravitation in its entire generality, and to apply it with demonstrative evidence to all the movements within the solar system. His doctrine was, that all material bodies attract each other with a force directly proportional to the number of their particles, and inversely proportional to the squares of their distances. Descartes had sought the cause of the motion of the planets around the sun, and of the satellites around the planets, in the rotatory motion of a subtle matter. But Newton and Kepler have rescued the laws of the material universe from the thraldom of a false philosophy, and left to later times merely the development of the truths which they established. By the application of their principles, as well as by new discoveries, several succeeding astronomers have gained a high reputation; thus, Halley by his theory of comets; Bouguer and Maupertuis, by their exertions to determine the form of the earth; Meyer, by his lunar tables; and Bradley, by the discovery of the aberration of light. The progress recently made in Astronomy has been very great. The existence of the planet Neptune was ascertained, not, as usual in such cases, by chance, but by the most profound calculations; and its approximate position was fixed before it was seen. These results were attained, not by one, but by two astronomers—one in England, the other in France; and neither knew of the investigations of the other. Forty years elapsed, after the discovery of the fourth asteroid, before a fifth was found: ten more were soon discovered, and their number has been gradually increased until about eighty have been found. An eighth satellite has been added to those of Saturn: and it was discovered on the very same day by an English and an American astronomer. The improvement of telescopes, &c., have led to the best results; and better methods of calculation and observation have enabled astronomers to derive the greatest advantages from the more perfect means placed at their disposal.

AS'TROSCOPE (*astron*, a star; and *skopeo*, I examine: *Gr.*), an old astronomical instrument, composed of two cones, on whose surface the constellations were delineated, and by means of which the situation of a star might easily be known.

ASY'LUM (*asulon*: from *a*, not; and *sulao*, I rob: *Gr.*), in Antiquity, a place of refuge for offenders, where they were screened from the hands of justice. The use of altars and temples for such a purpose was very ancient. The Jews had their asyla; the most remarkable of which were, the temple, the altar of burnt offerings, and the six cities of refuge. Among the Greeks and Romans, temples, altars, and statues were places of refuge for criminals of every description. They had an idea that he who fled to the temple or altar submitted his crime to the punishment of the gods, and that it would be impiety in man to take vengeance out of their hands. In former times the like immunities were granted by the pope to churches, convents, &c. At present, an *asylum* is a place of refuge for blind, deaf, or other afflicted or unfortunate people.

ASYM'PTOTE (*a*, not; and *sumpipto*, I fall together with: *Gr.*); two lines which continually approach each other, and yet never meet, are termed asymptotic or asymptotes by mathematicians. At least one of such lines must be a curve. However improbable the existence of such lines may be, it can be easily proved.

ASYN'DETON (*a*, without; and *sundeton*, a bond: *Gr.*), in Rhetoric or Composition, the omission of conjunctions, or other connecting particles of speech, in order to render the sentence more lively and impressive, as 'I came, I saw, I conquered.'

AT'ABAL, a kind of tabour used among the Moors.

AT'ABEK, the title given to the rulers of the small states into which the empire of the Seljuk Turks was divided during the eleventh, twelfth, and thirteenth centuries. According to one interpretation, the word signifies 'the Father of the Prince;' according to another, 'a faithful parent.'

ATARAX'IA, or **AT'ARAXY** (*ataraxia*, freedom from passion: *from a*, without; and *taraxis*, confusion: *Gr.*), a term used to denote that calmness of mind which secures us from all emotions arising from vanity or self-conceit. *In this consisted the summum bonum, or sovereign good, of* the Stoics.

A'TAXY (*ataxia*: from *a*, without; and *taxis*, order: *Gr.*), *in a general sense, the want of order; with Physicians it signifies* the irregularity of crises and paroxysms of fevers.

A TEM'PO (in time: *Ital.*), in Music, is a term employed, when the regular measure has been interrupted, to show that the usual time is to be again observed.

ATHANA'SIAN CREED, a formula of faith ascribed to St. Athanasius, which has been adopted into the liturgy of the Church of England. In consequence of its comminating character several attempts have been made to remove it from the Prayer Book.

A'THEIST (*atheos*: from *a*, without; and *Theos*, God: *Gr.*), one who denies the existence of God or Providence.

ATH'ELING (*athel*, noble: *Sax.*), the title given to the king's eldest son among the Saxons, as that of Prince of Wales is in our time.

ATHENÆ'UM (*Athenaion*, a temple dedicated to Minerva: *Gr.*), in Antiquity, a public school in which the professors of the liberal arts held their assemblies, the rhetoricians declaimed, and the poets rehearsed their performances. That at Rome, built by the emperor Adrian, was situated on the Capitoline hill, and had a staff of professors like a university. Besides the instructions given in it, there were recitations by orators, poets, &c. The most celebrated Athenæa were those at Athens, at Rome, and at Lyons.

ATHLE'TÆ (*athlētēs*, a prize-fighter: *Gr.*), in Antiquity, men of remarkable strength and agility, disciplined to perform in the public games. Under this general term were comprehended wrestlers, boxers, runners, leapers, throwers of the disk, and those who practised exercises exhibited in the Olympic, Pythian, and other solemn sports, in which there were prizes allotted to the conquerors.

ATHWART', a sea term, signifying across the line of a ship's course.

ATHYM'IA (*Gr.*: from *a*, without; and *thumos*, courage), in Medicine, the dejection of spirits attendant upon some diseases.

AT'IBAR, in Commerce, gold-dust obtained on the coast of Africa.

ATLAN'TES (from *Atlas*), in Architecture, images of men, used as pillars, supporting buildings like Caryatides.

ATLAN'TITES (supposed to be the daughters of *Atlas*), in Astronomy, another name for the Pleiades.

AT'LAS (probably from *a*, euphon.; and *tlao*, I bear: *Gr.*), in Geography, a collection of maps, more properly a book containing maps of the whole world; so called from Atlas, who was fabled to have borne the world on his shoulders.——It is also the name of a chain of high mountains in Africa, extending from the coast of the Atlantic to the border of Egypt.——ATLAS, a rich kind of satin, made in the East Indies: it is either plain, striped, or flowered, and interworked with gold: its manufacture is beyond the reach of European art. Though formerly in great repute, it is but little used at present.

ATMOSPHERE (*atmos*, vapour: *sphaira*, a sphere: *Gr.*). The ring of subtle, invisible, elastic fluid, surrounding our globe, and reaching about 45 miles above the earth's surface, is termed the atmosphere. The air of which it is composed is 816 lighter than water. Four-fifths of it, by bulk, are nitrogen, the remaining fifth oxygen; it has also a little carbonic acid, and some vapour of water, which varies very considerably at the same place at different times. [See HYGROMETRY.] Though invisible, except in large masses, and without smell or taste, yet it is a substance possessing all the principal attributes of matter; it is impenetrable, ponderable, compressible, dilatable, and its particles are operated on, like those of other bodies, by chemical action. It is indispensable to the life of all organic beings; it is the agent of combustion, and the principal medium of sound. Although the atmosphere is one of the most transparent bodies in nature, yet its transparency is not perfect. Its particles absorb one portion of the light they receive, transmit a second, and reflect a third. Hence it is that light becomes diffused over terrestrial objects and enables us to see those upon which the rays of the sun do not directly fall, and hence the phenomenon of twilight, by which we see things after the sun has set. The greater the extent of atmosphere traversed by rays from a luminous body the fewer do those rays become. The light of the sun in the zenith is much more powerful than when it is near the horizon. The blueness of the heavens is owing to the reflection of light by the particles of air, and not to the colour being proper to them. The air has the property of reflecting the blue rays of the spectrum more than the other rays. As the blue rays disappear with the increasing depth of atmosphere, the red rays become predominant, and this is the reason that when the sun is at the horizon it is of an orange or red colour. The refracting power of the atmosphere increases from the zenith to the horizon, and causes us to see objects, except when they are in the zenith, at places where they really are not. Hence the sun's disk becomes enlarged the lower it sinks, and we are able to see a portion of it when, in fact, the whole is below the horizon. The atmosphere has also a polarizing effect, and maps of its polarizing power have been constructed, from which we perceive that the curves of equal polarisation are related to three principal neutral points or poles of non-polarisation. Professor Wheatstone constructed an ingenious apparatus, which he called a polar clock or dial, for determining the apparent solar time as long as the sun's rays illuminate the atmosphere. His method consisted in determining the diurnal changes of the plane of polarisation at the north pole of the sky. Instruments have been invented for ascertaining the electrical condition of the atmosphere at any given moment at the place of observation. It appears that the atmosphere is nearly always positively electric, and that fluctuations in atmospheric electricity produce two maxima and two minima in the twenty-four hours. As to the temperature of the air, as the sun is the only source of heat which need be taken into account, it is manifest that there must be a considerable variation of temperature in every twenty-four hours. The minimum of this variation takes place about half an hour before sunrise, and the maximum in our climate about 2 P.M. The extent of the daily range varies considerably at different places. It is least at sea, and greatest on the middle of a large continent. Small islands surrounded by a large expanse of ocean enjoy an equable climate. The less elevated the sun above the horizon, the more feeble is its heating power, because its rays cross a greater thickness of atmosphere, and many of them glance along the surface of the ground without resting upon it. Hence the coldness of the polar regions throughout the year, and of our climate in winter. Hence, also, the greater warmth of the atmosphere in the neighbourhood of the equator. The higher we go into the atmosphere the colder becomes the temperature, because we move farther and farther out of the range of the earth's reflected heat. As to other phenomena of the atmosphere, see BAROMETER, HYGROMETRY, WINDS, AURORA BOREALIS.

ATOLL (*Ind.*) or *Lagoon Island*, a ring formed by coral-zoophytes in the ocean, enclosing a tract of smooth water. Atolls abound in the Pacific and Indian Oceans. The ring is usually elevated into land formed of sand, on which palms sometimes grow. It is often more or less incomplete, and sometimes it consists of a great number of separate little atolls. The water usually breaks furiously upon the outer side of atolls. They vary in size, some being less than a mile in diameter, whilst the Suadiva atoll is 44 geographical miles in one direction and 34 in another, and Rimsky atoll is 54 miles by 20. [See CORAL ISLANDS.]

A'TOM (*atomos: from a*, not; and *tomē*, a cut: *Gr.*), in Philosophy, an ultimate particle of matter. Two opinions, directly opposed to each other, have long had currency with regard to the constituent particles of material things; the one, that matter is composed of an assemblage of minute particles, or atoms, incapable of further division; the other, that there is no limit to its divisibility, the smallest conceivable portion still consisting of an infinity of parts. The first of these theories, which is commonly distinguished by the name of the ATOMIC PHILOSOPHY, was originated in Greece by Leucippus; it was supported by Democritus, and subsequently improved by

Epicurus and his disciples. The Epicureans professed to account for the origin and formation of all things by supposing that these atoms were endued with gravity and motion, and thus came together into the different organized bodies we now see.

ATOM'IC THE'ORY. [See AFFINITY.]

A'TONY (*atonia*, languidness: from *a*, without; and *tonos*, a brace: *Gr.*), a defect of tone or tension, or a relaxation of the solids of the body.

A'TRA BI'LIS (black choler: *Lat.*), a disposition to a dark biliary secretion, usually visible throughout the whole frame.

ATRIP', in Nautical language, is applied either to the anchor or sails. The *anchor* is atrip when it is just drawn out of the ground in a perpendicular direction. The *topsails* are atrip when they are just started from the cap.

A'TROPA (*Atropos*, one of the Fates: on account of its deadly effects), in Botany, a genus of plants, of the nat. order *Solanaceæ*, one species of which, the *Atropa Belladonna*, or *Deadly Nightshade*, is remarkable for bearing berries of a fine black colour, which are highly poisonous. The flowers are bell-shaped, dusky on the outside and purplish within. The fruit has a nauseous sweet taste, and is full of small kidney-shaped seeds. From it is extracted the medicine called Belladonna, which is a narcotic and diaphoretic. It is also employed by oculists to produce dilatation of the pupil, which it does on being dropped into the eye. It is said that the juice of this plant was mixed with the food with which the Scotch were bound to supply the Danes during a truce, and that they were so intoxicated thereby, that Sweno's army was in great part killed when asleep.

A'TROPHY (*a*, not; and *trepho*, I nourish: *Gr.*), a disease in which the body, or some of its parts, not receiving necessary nutriment, insensibly wastes away.

ATTACH'MENT (*attacher*, to stick to: *Fr.*), in Law, a process issuing, in a summary way, from a court of record, against a person guilty of contempt of its rules.——FOREIGN ATTACHMENT. Under the custom of the City of London, whenever process for debt, from the mayor or sheriff's court, is returned *nil*, the plaintiff may attach the debt due by a third person to the defendant, to satisfy his claim.

ATTACK' (*attaque*: *Fr.*), in the Military art, a general assault, or onset, made to gain a post, or any particular point. Every combat consists of attack and defence: the first is generally the most advantageous; and an experienced general chooses it, if possible, even in a defensive war. Those attacks are considered the best where all the forces can be directed in concert towards that point of the enemy which is the key of his position.

ATTAIN'DER (*teindre*, to stain: *Fr.*), the penalty by which the estate and life of a traitor or other convicted person are forfeited. It is the immediate inseparable consequence of sentence of death. When that sentence is passed, the person is said to be attaint (*attinctus*, *Lat.*), and in law he is considered as already dead (*civiliter mortuus*). A *bill of attainder* is a bill brought into parliament for attainting persons convicted of high treason. A person attainted of high treason forfeits all his lands, tenements, and hereditaments; his blood is corrupted, and he and his posterity are rendered base; and this corruption of blood cannot be taken off but by act of parliament. Attainders may be reversed or falsified (i. e. proven to be false) by writ of error, or by plea.

ATTAINT' (*atteinte*, a damage: *Fr.*), in the Veterinary art, is a diseased limb, proceeding from a blow.

ATTEN'TION (*attentio*, from *attendo*, I take heed: *Lat.*), the word of command given in the British army, preparatory to any particular exercise or direction.

ATTEN'UANTS (*attenuo*, I make thin: *Lat.*), medicines which dilute the blood.

AT'TIC (*Attikos*, Athenian: *Gr.*), in Architecture, a sort of building in which there is no roof or covering to be seen, as was usual in the houses of the Athenians.——The ATTIC, or ATTIC STORY, is the upper story of a house.——The ATTIC BASE is a peculiar kind of base employed chiefly in the Doric and Ionic orders.

AT'TICISM (*attikismos*: *Gr.*), a concise and elegant form of expression, such as a polished Athenian might be expected to use. The brilliant style of the Attic writers was greatly admired by the Romans.

ATTI'RE (*attirail*, apparatus: *Fr.*), in Heraldry, a term designating the horns of stags and similar animals in blazoning coats of arms.

ATTOL'LENS (*attollo*, I raise up: *Lat.*), in Anatomy, an epithet applied to certain muscles, otherwise called *levatores* and *elevatores*.

ATTOR'NEY (*attornatus*, a person set in place of another: *Mod. Lat.*), one who is appointed by another to do a thing in his absence. An attorney-at-law is one who acts in the courts of law. No attorney can practise in any court, unless he has been admitted and sworn an attorney of that particular court. He must have served under articles of clerkship, in the office of another attorney, and must pass a public examination. As an officer of the court in which he is admitted, an attorney enjoys several privileges, and is liable, on the other hand, to the censure and correction of the judges.——A *private* attorney acts upon particular occasions, and is authorized by a *letter of attorney*, which gives him full power to act.

ATTOR'NEY-GEN'ERAL, the chief law officer of the crown, appointed by letters patent. The office is a very important one, and the duties numerous and onerous. The holder conducts all suits and prosecutions in respect to the public revenue, exhibits informations against persons who disturb or endanger the state, appears on behalf of the crown in all legal proceedings where the interests of the crown come into question, and, in conjunction with the solicitor general, advises the government upon legal points. The chief lawyer of the day is usually selected for the post, and he is almost invariably knighted on receiving the appointment. Upon a vacancy occurring in the chancellorship, or any of the chief judgeships, it is the custom to make him an offer of the place. Upon a change of ministry he resigns office. His income from official and general business transacted by him usually exceeds 20,000*l.* a year.

ATTRAC'TION (*attrachio*, from *attratio*, I draw to: *Lat.*), that property of bodies by which they mutually tend towards each other; it varies according to the nature of the bodies attracted, and the circumstances under which this attraction takes place. All bodies are supposed to consist of very small undecomposable particles named atoms, which form groups termed molecules. The immanent forces of atoms, leading to the formation of molecules, are named atomic forces; molecules though chemically decomposable are incapable of decomposition by any mechanical force whatever; and, therefore, in a mechanical point of view, the molecule may be regarded as the fundamental element of bodies. Molecules are kept at certain distances apart, by a force called molecular force, which exhibits itself in the form of attraction (frequently called the attraction of cohesion) when the space between the molecules is increased, but in the form of repulsion when such space is lessened. [See GRAVITATION].

AT'TRIBUTES (*attribuo*, I assign to: *Lat.*), in Logic, are the predicates of any subject, or what may be affirmed or denied of anything.——ATTRIBUTES, in Painting and Sculpture, are symbols added to a figure or group, which are characteristic of the principal subject. Thus the eagle is an attribute of Jupiter; a peacock of Juno; a caduceus of Mercury; a club of Hercules, &c.

ATTRI'TION (*attritus*, a rubbing against: *Lat.*), the rubbing or striking of bodies one against another, so as to throw off some of their superficial particles.——ATTRITION, in Roman Catholic Theology, an imperfect kind of sorrow, which, with confession to a priest, is considered to be a sufficient means of obtaining pardon for sin.

AUC'TION (*auctio*, an increase: *Lat.*), a public sale of goods to the highest bidder. A bidder at an auction, under the usual conditions, may retract his bidding any time before the hammer is down, but the fall of the hammer indicates the acceptance of his offer by the auctioneer on the part of the seller, and both parties are then bound.

AU'CUBA JAPON'ICA, an evergreen shrub, nat. ord. *Cornaceæ*, much cultivated in England, where we have hitherto had only the variety with spotted leaves, and only female plants. Mr. Fortune has lately sent male plants from Japan, so that we shall now have the shrubs adorned during winter and spring with bunches of red berries.

AUCUPA'TION (*aucupatio: Lat.*), fowling, or the art of bird-catching.

AU'DIENCE (*audientia*, from *audio*, I hear: *Lat.*), the ceremonious admission of ambassadors or other public ministers to the presence of the sovereign, for the purpose of presenting his credentials, taking leave, &c. In England audience is given to ambassadors in the presence-chamber, and to envoys and residents in a gallery, closet, or any place where the sovereign happens to be.——AUDIENCE is also the name of an ecclesiastical court, held by the archbishop of Canterbury. It originated in the extrajudicial hearing of causes by the archbishop at his own palace.

AU'DIT (*audio*, I hear: *Lat.*), a regular examination of accounts by officers appointed for that purpose.

AU'DITOR (a hearer: *Lat.*), an officer appointed to examine accounts.

AUDITO'RIUS MEA'TUS (the auditory passage: *Lat.*), the passage or entrance into the ear, conveying the air to the auditory nerve.

AU'DITORY NERVES, the seventh pair of nerves arising from the *Medulla oblongata*, and distributed to the ear, tongue, &c.

AUGETT'E (a *dim.* of *auge*, a trough: *Fr.*), in Fortification, the wooden pipe which contains the powder by which a mine is fired.

AU'GITE (*augē*, radiance: *Gr.*), a mineral of which there are many varieties, differing both in form and colour. It is supposed to be essentially the same as HORNBLENDE, and that the difference of its external appearance arises from its having cooled more rapidly. Different names have been applied to some of its most remarkable varieties; it is *Diopside* when in greenish-white transparent crystals; *Sahlite*, when it is in imperfectly prismatic and foliated masses; and *Coccolite*, when in small, slightly-cohering grains. It is one of those few mineral substances, the composition of which may be imitated by the artificial mixture of its constituents, and subjecting them to fusion. More than half of it consists of silica; its other component parts are lime, magnesia, alumina, and oxide of iron. It is common in basaltic and volcanic rocks.

AUGMENTA'TION (*augmen*, an increase: *Lat.*), in Heraldry, a particular mark of honour generally borne either on the escutcheon or a canton; as *argent*, a hand *gules*, borne by every baronet who cannot claim higher honour.

AU'GUR (*Lat.*), an officer among the Romans, appointed to ascertain the will of the gods by the interpretation of signs and omens, for the guidance of the state or individuals. The augurs bore a staff or wand as the ensign of their authority, and their dignity was so much respected, that they were never deposed, nor were any substituted in their places when they were convicted of the most enormous crimes. There was a college of augurs, which, from B.C. 300 to Sylla's time, consisted of nine. In his dictatorship they were increased to fifteen. Julius Cæsar added another one.

AU'GURY (*augurium: Lat.*), a species of divination, or the art of foretelling events, practised by the ancients. *Auguries* originally differed from *auspices*, inasmuch as the latter were limited to the omens afforded by birds, but in process of time they were extended to all *omens*.

AU'GUST, the eighth month of our year, containing thirty-one days. It was dedicated to the honour of Augustus Cæsar, because, being in the same month (before called Sextilis, or the sixth from March) created consul, he thrice triumphed in Rome, subjugated Egypt to the Roman sway, and put an end to the civil wars.

AUGUS'TAN denotes something relating to the emperor Augustus; as, *Augustan age*, *Augustan era*, &c.

AUGUS'TINES, a religious order, established in the 11th century, and called after the communities which had been established by St. Augustine, but which had long ceased to exist. They were commonly called *Austin friars*, and, before the Reformation, had thirty-two houses in England. There are nuns of this order, who, at Paris, are known by the name of the *religious women of St. Genevieve*, and their abbess is the chief of the order. They are clothed in black.

AUK, the popular name of some sea birds, placed by naturalists in different genera. All have strong bills and webbed feet. The little auk (*Mergulus melanoleucos*) is only a winter visitor to Britain, and chiefly frequents the Orkneys and Shetlands. The great auk (*Alca impennis*) has become extremely rare, and perhaps it may be extinct. The wings are so short that the bird cannot fly, but they are of great service in diving for fish. The razor-bill is also an *alca*.

AU'LIC (because it followed the emperor's *aula*, or court), an epithet given to certain officers in the old German empire, who composed a court which decided, in most cases, without appeal. This court, which was proverbial for the slow administration of justice, had not only concurrent jurisdiction with the court of the imperial chamber, but, in many cases, exclusive jurisdiction. The right of appeal, possessed by the estates, existed also in regard to the judicial decisions of the aulic court.

AURE'LIA, or *Chrysalis*, the name given to the form which lepidopterous insects assume between the caterpillar and the winged condition.

AURE'OLA (*aureolus*, a *dim.* of *aureus*, golden: *Lat.*), in its original signification, denoted a jewel which was proposed as a reward of victory in some public dispute. Hence the Roman schoolmen applied it to the reward bestowed on martyrs, virgins, &c., on account of their works of supererogation. Painters use it to signify the glory which in old pictures is represented as surrounding the whole body, the *nimbus* being that placed round the head. The aureole was only given to the Father, Son, and Virgin.

AU'REUS (golden: *Lat.*), a Roman gold coin, worth 25 denarii, or 100 sestertii; and from 17*s.* 8½*d.* to 21*s.* 1½*d.*, according to the relative values of gold and silver.

AU'RICLE (*auricula*, a *dim.* of *auris*, the ear: *Lat.*), in Anatomy, that part of the ear which is prominent from the head, called by many authors *Auris externa.*—Auricles of the heart, two cavities in the mammalian heart, placed above the two cavities called ventricles. The auricles are in communication with the ventricles, but not with each other. The right auricle receives the blood after it has been distributed through the body and been collected by the veins. Thence it passes into the right ventricle, which propels it by the pulmonary arteries to the lungs, where it is oxygenated. Collected by the pulmonary veins, it is conveyed to the left ventricle, by the contraction of which it is sent along the main arterial trunk, called the AORTA, and by its branches is distributed through the veins, and thus the circuit is completed. The auricles dilate and contract together; the ventricles also dilate and contract together, but these operations are performed alternately with those of the auricles. These successive contractions and dilatations make the pulsations of the heart, the contraction being called *systole*, and the dilatation *diastole*.

AURIC'ULA (same *deriv.*), a garden flower of which there are many cultivated varieties, all derived from the yellow *Primula Auricula* of the Swiss Alps.

AURIC'ULAR CONFES'SION (same *deriv.*), a mode of confession among Roman Catholics. In fulfilment of the duty of confessing our sins 'to one another,' enjoined by Christ, it became the custom in the early church to make *public* confession of sins. Certain inconveniences, however, at length arose from the practice, which induced Leo the Great, in the fifth century, to recommend private confession to a priest in certain cases. But the obligation of auricular confession was not imposed until the fourth council of Lateran, in 1215.

AURI'GA (a charioteer: *Lat.*), or the WAGONER, in Astronomy, a constellation of the northern hemisphere, containing about 261 stars.

AURISCAL'PIUM (*Lat.:* from *auris*, the ear; and *scalpo*, I scrape), a surgical instrument employed to operate on the ear.

AURO'RA (the goddess of the morning; *Lat.*), the morning twilight, or that faint light which appears in the morning when the sun is within 18° of the horizon.

AURO'RA BOREA'LIS, in Meteorology, the *northern lights*, a kind of meteor appearing in the northern part of the heavens, most frequent and most brilliant during the winter solstice. We often see in the north, near the horizon, usually a short time after sunset, a dark segment of a circle, surrounded by a brilliant arch of white or fiery light; and this arch is often separated into several concentric arches, leaving the dark segment visible between them. From these arches, and from the dark segment itself, in high latitudes, columns of light, of the most variegated and beautiful colours, shoot up towards the zenith, and sometimes masses like sheaves of light are scattered in all directions. In the Shetland Islands, the *merry dancers*, as they are there called, are the constant attendants of clear evenings, and cheerers of the long winter nights. In still more northern countries, as Norway, Lapland, and Siberia, they greatly enliven the snowy landscapes. They commonly appear at twilight, near the horizon, of a dun colour, approaching to yellow; sometimes continuing in that state for several hours, without any sensible motion; after which they break out into streams of stronger light, spreading into columns, and altering slowly into a thousand different shapes, varying their colours from all the tints of yellow to the obscurest russet. They often cover the whole hemisphere, and then make the most splendid appearance. Their motions, at all these times, are amazingly quick; and they astonish the spectator with the rapid change of their form. They break out in places where none were seen before, skimming briskly along the heavens, and are suddenly extinguished, leaving behind them a uniform dusky track. This is again illumined in the same manner, and as suddenly left a dull blank. In certain nights, they assume the appearance of vast columns, on one side of the deepest yellow, on the other declining away till they become undistinguished from the sky. They have generally a strong tremulous motion, which continues till the whole vanishes. During the winters of 1837 and 1838, the Aurora Borealis was several times witnessed in England; but we, who only see the extremities of this northern phenomenon, have but a faint idea of its grandeur or its motions. Various theories have existed respecting its cause: but little doubt is now entertained of its being occasioned by the passage of electricity through the upper regions of the atmosphere, where it is highly rarefied; its appearance, in fact, exactly resembling the effects of ordinary electricity when passing through rarefied air. There is the same variety of colour and intensity; the same undulating motion and coruscations; the streams exhibit the same diversity of character, being at one moment minutely divided in ramifications, and at another beaming forth in one body of light, or passing in distinct broad flashes; and when the rarefaction is considerable, various parts of the stream assume that peculiar glowing colour which occasionally appears in the atmosphere, and is regarded by the uninformed observer with astonishment and fear.

AU'RUM FUL'MINANS (fulminating gold: *Lat.*), a precipitate of gold, so called because of the explosion which it causes when it is gently rubbed. [See FULMINATING POWDER.]

AU'RUM MUSI'VUM (mosaic gold: *Lat.*), an obsolete name for bisulphuret of tin, used by statuaries and painters for giving a gold colour to their figures.

AU'RUM POTA'BILE (drinkable gold: *Lat.*), a preparation of gold not now used.

AUS'PICES (*Lat.*: from *avis*, a bird; and the obs. *specio*, I behold), a kind of soothsaying among the Romans, originally depending on the flight or singing of birds. [See AUGURY.]

AUS'TRAL (*Auster*, the south wind: *Lat.*), relating to the south: thus the six signs on the south side of the equinoctial are called austral signs.

AUTO-DA-FE' (act of faith: *Span.*), the public infliction of the punishment of death, with many circumstances of solemnity and horror, upon those found guilty of heresy, in Spain and Portugal, at the instance of the Inquisition. Those who professed penitence were strangled before their bodies were burned; the impenitent were burned alive. The last Spanish *Auto-da-fé* was celebrated in 1680, at the wish of Charles II., who thought that a religious rite of this sort would draw down the favour of heaven upon him and his kingdom. Upwards of 340,000 persons have suffered punishments of various kinds at *Autos-da-fé*, in Spain, from the first celebrated at Seville in 1481

AU'TOGRAPH (*autos*, self; and *grapho*, I write: *Gr.*), an epithet applied to whatever is in a person's own handwriting, as an autograph letter.

AUTOM'ATON (*automatos*, self-moving: from *autos*, self; and *mao*, I attempt: *Gr.*), Every mechanical construction, which, by virtue of a latent intrinsic force not obvious to the sight, can carry on for a certain length of time such movements as resemble those of an animal, is an automaton. But the term is generally applied to the figure of an animal, to which motion is given by wheels, springs, and weights, internally placed, and causing apparent animation; as the mechanical chess-player and flute-player. The practice of making these automata is much less frequent at present than formerly; ingenious mechanicians now find themselves better rewarded by directing their talents to the self-acting machinery of modern manufactures. As Dr. Ure observes, 'it is in our modern cotton and flax-mills that automatic operations are displayed to most advantage; for there the elemental powers have been made to animate millions of complex organs, infusing into forms of wood, iron, and brass, an intelligent agency.' Many of the needs of a steam engine are automatically supplied. Thus, the boiler is furnished with a self-feeding apparatus, and with a safety-valve, which corrects over pressure; the heat of the fire can be regulated by a valve in the chimney acting automatically; the engine itself removes the condensed water, &c.

AU'TUMN (*auctumnus*, from *auctus*, an increase: *Lat.*, being the season of plenty), the third season in the year, which begins, in the northern hemisphere, on the day on which the sun enters Libra, that is, about the 22nd of September, and continues while he is passing through the three signs, Libra, Scorpio, and Sagittarius. The elliptic form of the earth's orbit prevents the four seasons from being equal in length; and the precession of the equinoxes causes them to vary a little from age to age. At present the length of autumn is 89 days, 16 hours, and 47 minutes. It is the time which the sun takes to pass from the autumnal equinox to the winter solstice.

AUTUM'NAL SIGNS, the three signs, Libra, Scorpio, and Sagittarius, through which the sun passes during the season of autumn.

AUXIL'IARY VERBS (*auxilium*, assistance: *Lat.*), in Grammar, are such verbs as help to form or conjugate others: as, in English, the verbs 'to have' and 'to be.'

AVA'TAR (descending: *Sans.*), a term used by the Hindoos to express an incarnation or descent of Vishnu, their deity, of which nine are believed to be past, and the tenth is yet to come.

A'VE MARI'A (hail, Mary: *Lat.*), the Latin form of the angel Gabriel's salutation of the Virgin Mary. [See ANGELUS DOMINI.]

A'VENUE (*Fr.*; from *advenio*, I arrive at: *Lat.*), in ornamental Gardening, a walk planted on each side with trees, leading to a house, garden-gate, wood, &c., and generally terminated by some distant object. ——AVENUE, in Fortification, an opening or inlet into a fort, bastion, &c.——In Architecture, an approach to a palace or mansion, by a long line of columns, arcades, statues, &c.

A'VERAGE, the result from division of several sums added together by the number expressing how many of them have been added. Thus, if I buy a pound of anything for 5*s.*, another pound of it for 4*s.* and a third pound for 3*s.*, I have paid, *on an average*, 4*s.* per pound: that is, if each pound had cost 4*s.* the whole would have come to the same sum; and the average is formed by adding 5*s.*, 4*s.*, and 3*s.*, which make 12*s.*, and dividing by 3, the number of pounds, which gives 4*s.* The *method of averages* is a potent instrument of research which has come into use only of late years. It has been applied to physical phenomena as well as to the social and moral conditions of man, and has contributed greatly to the extension and accuracy of our knowledge. GENERAL AVERAGE, a term used among merchants and ship-owners, to denote the quota or proportion which each merchant or proprietor in the ship or lading is adjudged, upon a reasonable estimate, to contribute for any damage, loss, or necessary expense which has been incurred by any one for the good of all.

A'VIARY (*aviarium* from *avis*, a bird: *Lat.*), a place set apart for feeding and propagating birds.

A'VOIRDUPOI'S (*avoir du poids*, to have weight: *Fr.*, because employed in weighing heavy goods), a weight used in England, the pound being sixteen ounces.

AWARD', in Law, the judgment of an arbitrator, or of one who is not appointed by the law, but is chosen by the parties themselves for terminating their difference.

AWEIGH', a sea term, denoting that the anchor is just drawn up, and hangs perpendicularly.

AWL'WORT, the popular name of the *Subularia aquatica*; a British plant belonging to the order *Cruciferæ*, so called from its awl-shaped leaves, which grow in clusters round the root. It expands its white flowers under water.

AWN, a slender sharp process issuing from the glume or chaff in corn and grasses: the beard.

AX'E-STONE, a mineral: a sub-species of nephrite, of an olive or grass-green colour. It is a tough silico-magnesian stone, found chiefly in New Zealand and the South Sea Isles, where it is used by the natives for axes and other instruments.

AXIL'LA (*Lat.*), in Anatomy, the arm-pit, or the cavity under the upper part of the arm.—— AXILLA, in Botany, the apex of the angle formed by a branch with the stem, or by a leaf with a branch.

AX'INITE (*axinē*, an axe: *Gr.*), a mineral which sometimes occurs in lamellar masses, but commonly in axe-shaped crystals. Its edges are thin and sharp, like an axe, whence its name. Its principal constituents are silica, alumina, and lime. It has been found in Cornwall and Saxony.

AX'IOM (*axiōma*, from *axioo*, I demand: *Gr.*), in Philosophy, is such a plain, self-evident proposition, that it cannot be made more plain and evident by demonstration; because it is itself better known than anything that can be brought to prove it. By axioms, called also maxims, are understood all common notions of the mind, whose evidence is so clear and forcible that a man cannot deny them without renouncing common sense and natural reason.

AX'IS (*Lat.*), in Anatomy, the second vertebra of the neck, so called from the head's turning on it like an axis.——AXIS, in Astronomy, an imaginary right line supposed to pass through the earth, sun, planets, satellites, &c., and about which they perform their respective diurnal rotations. The axis of the earth is inclined to the ecliptic at an angle of nearly sixty-six degrees and a half. ——AXIS, in Geometry, a right line conceived to be drawn from the vertex of a figure to the middle of the base. It is so called because the figure, by revolving round this line, is conceived to generate a solid. The axis of a circle is the same as the diameter.——AXIS, in Mechanics, a certain line about which a body may move, as the axis of a balance, &c.——AXIS, in Optics, is that ray, among all others that are sent to a lens which passes through its centre. ——AXIS IN PERITROCHIO, or *wheel and axle*, one of the five mechanical powers or simple machines. It consists of a wheel (*Peritrochius*) fixed on an axis. The power is applied at the circumference of the wheel, and the weight is raised by a rope that is wound up on the axis while the wheel turns round.——AXIS OF OSCILLATION is a line parallel to the horizon, passing through the centre about which a pendulum vibrates, and perpendicular to the plane in which it oscillates.——AXIS of a vessel is an imaginary line passing through the middle of it, perpendicular to its base, and equally distant from its sides.

AX'OLOTL (*Mex.*), a fish-like animal living in the lake which is adjacent to the city of Mexico. It is furnished with both lungs and gills, and is therefore truly amphibious. It is esteemed as an article of food. Naturalists place it in the family of *Sirenidæ*.

AYE-AYE (*Chiromys Madagascariensis*), the name of a Madagascar quadrumanous animal, allied to the lemurs, remarkable for the position of the mammæ at the lowest part of the abdomen, and for having the middle finger of each hand very long and slender, and terminated by a hooked claw. The large front teeth enable it to gnaw wood easily, and it is supposed that, in its native woods, it eats into trees, for the purpose of devouring the larvæ of insects, which it extracts with its long finger. But in captivity, in this country, it rejects all the insect larvæ offered to it. Its habits are nocturnal. Its curious structure has excited much interest and some controversy amongst zoologists.

AZA'LEA (*azaleos*, dry: *Gr.*), in Botany, a genus of plants with beautiful monopetalous flowers, the chief species of which are flowering shrubs, inhabiting North America and China. They belong to the nat. ord. *Ericaceæ*, and are allied to the rhododendron.

AZ'IMUTH (*assamt*, a path: *Arab.*), in Astronomy, an arc of the horizon intercepted between the meridian of the place and the vertical circle passing through the centre of a celestial object.——MAGNETICAL AZIMUTH is an arc of the horizon contained between the sun's azimuth circle and the magnetic meridian.——AZIMUTH CIRCLES, or *vertical circles*, imaginary great circles passing through the zenith and nadir, and cutting the horizon at right angles. The altitudes of the heavenly bodies are measured on these circles.——AZIMUTH COMPASS, an instrument for finding, in a more accurate manner than by the common sea compass, the magnetical amplitude of the sun or stars.

AZO'TE (*a*, not; and *zōe*, life: *Gr.*), one of the constituents of atmospheric air, otherwise NITROGEN, which see.

A'ZURE (*azzurro*: *Ital.*), the blue colour of the sky. Among Painters, this word originally signified *lapis lazuli*, and the blue colour prepared from it. At present the latter is called *ultramarine*; and the blue glass made from the earth of cobalt and other vitrifiable matters, which, when in masses, is called *smalt*, is, in the state of fine powder, known by the name of *azure*. Azure, being employed to colour starch, is also called *starch-blue*.——AZURE, in Heraldry, the blue colour in the arms of any person below the rank of a baron. In the escutcheon of a nobleman it is called *sapphire*; and in that of a sovereign prince, *Jupiter*. In engraving, this colour is expressed by lines or strokes drawn horizontally.

A'ZYMA (*azumos*: from *a*, not; and *zumē*, leaven: *Gr.*), the feast of unleavened bread among the Jews.

A'ZYMITES (same *deriv.*), in Church History, Christians who administer the eucharist with unleavened bread. This appellation was given to the Latin by the Greek church, and also to the Armenians and Maronites

B

B, the second letter and first consonant in all European and most other alphabets, is formed by a quick emission of the breath, and a sudden opening of the lips; it is therefore called a *labial*, and its pronunciation differs but slightly from *p* and *v*. Among the Romans, it was used as an abbreviation, in inscriptions, for *Baccho*, &c.; B.B. for *bene bene*, that is *optime* (best); B.F. *benefactum* (done under favourable auspices), affixed to decrees, &c. We use it for *Bachelor*, as B.A. Bachelor of Arts, B.D. Bachelor of Divinity; for *before*, as B.C. Before Christ; for *Bath*, as C.B. Companion of the Bath; G.C.B. Grand Cross of the Bath; for *bene*, as N.B. *nota bene* (mark well), &c. B, as a numeral among the Romans, stood for 300, and, with a dash over it, for 3000. B, in the ecclesiastical calendar, is one of the dominical letters, and in Music is the seventh note in the gamut.

BA'AL, an idol among the ancient Phœnicians and Carthaginians, worshipped chiefly at Tyre; supposed to represent the sun, and to be the same as the Bel or Belus of the Greeks. The word signifies lord or commander; the character of the idol was varied by different nations and at different times. Of the manner in which Baal was worshipped we have only imperfect and contradictory statements; but we are informed in the Bible that human victims were among the sacrifices offered to him.

BABOO'N (*babouin*: *Fr.*), the popular name of the members of the genera *Cynocephalus*, and *Papio*, apes with projecting ridges above the eyes, long and truncate muzzle, cheek pouches, ischiatic callosities, and generally no tail. They are the ugliest of the tribe, and have fierce and brutal dispositions, which render them tameable with great difficulty. They are vegetable feeders. They herd together in troops, and when they are living near cultivated ground, they make predatory incursions at night upon it. Their limbs are strong, the face dog-like, and the teeth of the same number and form as in man. The common baboon (*C. papio*) is an inhabitant of the Guinea coast. The Derrias (*C. hamadryas*) lives in the mountains of Arabia and Abyssinia, and its figure in a sitting posture frequently appears upon the temples and tombs of Egypt. It was dedicated to Thoth and the moon, and appears as the second amongst the four gods of death. The chacma (*C. porcarius*) is a native of South Africa, and is well known to the people of Cape Town. The Mandrill (*Papio mormon*) is the largest species.

BABYLON'ICA, in Antiquity, a species of rich weaving, so called from the city of Babylon, where the art of weaving hangings with a variety of colours was first invented.

BABYLON'ICS, in Literary History, a fragment of the ancient history of the world, ending at 267 years before Christ; and composed by Berosus, a priest of Babylon, about the time of Alexander.

BABYROUS'SA, the Indian hog. This quadruped, the *Babirussa Alfurus* of naturalists, belongs to the boar tribe. It is a native of the Indian Archipelago, and is remarkable for the great development of the upper canine teeth, which curl upwards, bending like horns, and almost touching the forehead.

BACCA (*Lat.*), in Botany, the berry, a succulent fruit, such as that of the currant and gooseberry, in which the calyx adheres to the ovary, and the parietal placentas when the fruit is ripe form a pulpy mass, in which the seeds lie.

BACCALAU'REAT (probably from *baccis laureis* donatus, presented with laurel berries: *Lat.*, on account of the custom among the ancient Greeks and Romans, and the modern Italians, of crowning distinguished persons with laurel), the first and lowest degree in continental universities, equivalent to the degree of bachelor of arts with us.

BACCHANA'LIA (from Bacchus), feasts celebrated in honour of Bacchus by the ancient Greeks and Romans. Their times of celebration were spring and autumn, the former in the city, and the latter in the fields. The celebrants personified Silenus, Pan, fauns, satyrs, &c.; and in this manner appeared in public, acting frantically, and crying out *Evoe Bacche!* or *Io Bacche!*

BACCIF'EROUS (*bacca*, a berry; and *fero*, I bear: *Lat.*), a term applied to berry-bearing plants. [See BACCA.]

BACH'ELOR [see BACCALAUREAT]. Connected with knighthood, it has been derived from the *baculus*, or staff with which knights were usually invested; or from *bas chevaliers*, an inferior kind of knights. In old French, the word signifies a young man, as *bachalette*, a young woman; in its primitive sense, meaning one who has not been married.——BACHELOR, in the Universities, one who has attained the first degree in the liberal arts and sciences in the particular study to which he devotes himself. At Oxford a student must have resided twelve terms, at Cambridge nine, before he can take the degree of Bachelor of Arts. ——BACHELOR, an ancient denomination of knighthood, given to such as had not a sufficient number of vassals to carry their banners, to such knights-bannerets as were not of age to display their own banner, to young cavaliers little more than initiated to arms, and, in a very honourable sense, to him who had overcome his antagonist in the tournament.——KNIGHTS BACHELORS the lowest rank of knights, whose titles are not hereditary. These are the *knights* of modern days.

BACK, a word used in various nautical phrases; as to 'back an anchor,' to 'back the sails,' to 'back astern,' &c.; meaning to carry out a small anchor to support the larger one—to arrange the sails for the ship to move back, in consequence of the tide favouring her—to manage the oars in a way contrary to the usual one, to move a boat stern foremost, &c. The word *back* has also various figurative as well as technical applications.

BACKGAM'MON (*bach*, little; and *cammon*, a battle: *Welsh*), an ingenious game played by two persons with the help of dice, on a board or table divided into parts, on which are twenty-four black and white spaces called points.

BACK'PAINTING, the method of painting mezzotinto prints pasted on glass with oil colours.

BACK'STAFF, an instrument used before the invention of the *quadrant* and *sextant*, for taking the sun's altitude at sea; it had this name because the back of the observer was turned towards the sun.

BACK'STAYS, the ropes or stays which extend from the topmast heads to both sides of a ship, to assist the shrouds in supporting the masts, when strained by a weight of sail, and to prevent them from giving way and falling overboard.

BAC'ULITES (*baculum*, a stick: *Lat.*), a genus of fossil shells of a straight form, allied to the ammonites. It is so abundant in the chalk of Normandy, that the name of *baculite limestone* has been given to it.

BADGE, an exterior ornament of a coat of arms, originally worn by the retainers or attendants of the nobility. It fell into disuse in the reign of Queen Elizabeth.——In Naval Architecture, an ornament placed on the outside of ships near the stern, containing either a window or the representation of one.

BAD'GER, the *Meles taxus* of naturalists, an animal which inhabits the north of Europe and Asia, and is found in many parts of England. It is of a clumsy make, with short thick legs, and long claws on the fore-feet; is very indolent and sleepy; feeds on insects, roots, earth-nuts, or berries; burrows during winter, hunts by night, and lies concealed by day.

BAG'GAGE (*Fr.*), in Military affairs, the clothes, tents, utensils of different sorts, provisions, and other necessaries belonging to an army.

BAG'NIO (*bagno*, a bath: *Ital.*), a house with conveniences for bathing and otherwise cleansing the body.——In Turkey, it is the name of prisons where slaves are kept.

BAG'PIPE, a musical wind instrument used chiefly in Scotland and Ireland. It is of high antiquity, and consists of two parts, namely, a leathern bag and three pipes. The bag of the Irish pipes is filled with wind by a bellows, that of the Scotch pipes by the mouth: and each is compressed with the arm, so as to sound the pipes. There are three of the latter; two of them, called the great and little *drones*, have but one sound each; the third is something like an oboe, and has eight finger-holes. Sometimes there are other pipes.

BAIL (*bailler*, to deliver up: *Old Fr.*), in Law, sureties given for the appearance, when required, of a person on his being set free from custody. In civil cases, bail is of two kinds, *above* and *below*: bail below, or common bail, is bail to the sheriff; and bail above, or special bail, is bail to the action. When a person is arrested on affidavit that he is indebted to the plaintiff 20*l.* or upwards, and that there is probable cause for believing he intends to leave the kingdom unless discharged by a judge's order, he cannot regain his liberty if he do not execute a bail-bond to the sheriff, that he will, at a period mentioned in the bond, put in special bail. At this period he must either put in special bail, consisting of two or more persons, who undertake that if he lose the verdict he shall pay the amount awarded against him, or render himself to custody, or that they will do it for him; or he must return himself into custody. In cases of felony, bail is taken by the magistrates where there is a presumption, from the nature of the case and the character of the person, that he will not abscond from the kingdom.——*To admit to bail* is to release upon security given by bondsmen.——*To justify bail*, is to prove by the oath of the person that he is worth the sum for which he is surety beyond his debts.

BAILEE' (same *deriv.*), in Law, the person to whom the goods of another (the bailor) are delivered for some purpose on the express or implied contract that they shall be delivered to some third person or redelivered to the bailor. The case of a carrier to whom goods are entrusted to be conveyed to some third party is a case of bailment. The sender of the goods is the bailor and the carrier is the bailee.

BAI'LIFF (same *deriv.*), a subordinate magistrate or officer appointed within a particular province or district: as the bailiff of hundred, liberty, &c. Sheriffs' bailiffs are officers appointed by the sheriff to execute writs. These, being bound in bond to the sheriff for the due execution of their office, are called bound bailiffs, vulgarly bum-bailiffs.——WATER BAILIFF, an officer who searches ships, gathers toll for anchorage, and arrests persons for debt upon the water.

BAI'LIWICK (*bailli*, a bailiff: *Fr.;* and *vicus*, a village: *Lat.*), a liberty exempt from the power of the sheriff, in which district the lord exercises the office of sheriff, and appoints his own bailiff. A bailiwick is also the hundred, or district, through which the authority of a bailiff extends.

BAIO'CO (*Ital.*), a small coin in the Papal States, one hundred of which make a Roman ducat.

BAI'RAM, a festival among the Turks, in imitation of the Christian Easter, celebrated after the fast of Ramazan, when it is customary to send presents from one to another, and otherwise to express the joy felt on the occasion.

BAIZE, a coarse woollen stuff, with a long nap, sometimes frized on one side: it is without wale, being manufactured on a loom with two treadles, like flannel.

BALÆ'NA (*phalaina*, a whale: *Gr.*), a genus of Whales, which includes the right-whale of sailors.

BA'LANCE (perhaps from *bilanx: bi*, two; and *lanx*, the basin of a balance: *Lat.*), an instrument for weighing commodities, consisting of a beam or lever suspended exactly in the middle, with a scale hung to each extremity, both scales being of precisely equal weight. Hence the term balance, in Mechanics, is understood to mean a peculiar application of that simple mechanical power called the lever, by which it is rendered useful in determining the difference or equality of weights in heavy bodies, and consequently their masses or quantities of matter. The difference between the common *scales* and the *steelyard* consists in this, that in the former a larger power or more weight is used to estimate the weight of a heavier body; in the latter the same power is employed, but applied at a varying distance from the fulcrum or fixed point. [See LEVER.]——The *hydrostatic balance* is an instrument to determine the specific gravity of fluid and solid bodies.——The *assay balance* is used to ascertain the exact weight of the different metallic bodies of which an ore, &c., is composed.——In accounts, *balance* is the *difference of two sums:* hence, to pay a balance is to pay the difference, and make the two accounts equal. ——BALANCE, or *Libra*, in Astronomy, a sign in the zodiac which the sun enters at the autumnal equinox.——BALANCE, in Horology, that part of a watch which, by its inertia, regulates the beat, and produces equable motion.

BALANCE OF POWER, the equipoise of nation and nation, an object of much solicitude amongst politicians, with a view to prevent any one nation becoming greatly stronger than, and domineering over, the others.

BALANCE OF TRADE, in Commerce, the equality between the value of the commodities bought of foreigners, and the value of the native productions exported. An opinion was long entertained that, when a nation imports to a greater extent than it exports, the balance of trade is against it—that is, that it loses by its trade; and *vice versâ*. But this opinion is now proved to be utterly groundless. So far from an excess of exports over imports being any criterion of an advantageous commerce, it is directly the reverse; for, were the value of the exports greater than the value of the imports, merchants would lose in every transaction with foreigners, and the trade with them would be speedily abandoned.

BA'LAS RU'BY, in Mineralogy, a ruby of the bright red spinel kind. It is much less valuable than the oriental ruby, or red sapphire.

BAL'CONY (*balcone*, a canopy: *Ital.*), in Architecture, a projection from the front of a house, surrounded by a balustrade or open gallery. In large buildings balconies are susceptible of considerable elegance of decoration, and may be made highly ornamental to the edifices to which they are attached.

BALDACHI'NO (a canopy: *Ital.*), in Architecture, a kind of canopy erected over an altar.

BALIS'TES (from *ballista: Lat.*) [See FILE FISH.]

BALL (*Germ.*), in Military affairs, comprehends all sorts of bullets for fire-arms, from the cannon to the pistol. Balls for pistols and small arms are made of lead, but cannon-balls are formed of cast iron.

BAL'LAD (*ballata: Ital.*), a short lyric composition, or tale in verse, of a simple and popular character.

BAL'LAST (*ballo*, I cast: *Gr.*), in Navigation, stones or other weighty articles placed in the hold of a vessel when she has no cargo on board, with the view of sinking her to the proper depth in the water In

Railway Engineering, ballast signifies that part of the road which forms a firm foundation for the rails and their sleepers. The best material for the purpose is broken stone.

BALL'-COCK, a hollow globe of metal attached to the end of a lever, which turns the stop-cock of a cistern pipe by floating on the surface of the water, and thus regulates the supply.

BAL'LET (*Fr.*), a dramatic entertainment, consisting of action and dancing only, invented by the Italians.

BALLIS'TA, or BALLIS'TÆ (*Lat.*, from *ballo*, I throw : *Gr.*), a military engine used by the ancients, in battle, to throw stones, darts, and javelins.

BALLIS'TICS (same *deriv.*), the art of using projectiles.——The BALLISTIC PENDULUM is an apparatus for measuring the velocity of military projectiles, and the impulse of the explosion of powder. In the former case, it is a box full of clay, or a heavy block of wood, into which the cannon-ball is fired; and the rate at which it vibrates gives, with easy calculations, the velocity at which the ball was moving. In the latter case, the gun to be experimented on is fixed to and forms part of the pendulum. When the ball is fired, the pressure produced by the gas generated by the explosion causes the pendulum to swing through a certain angle, and this being registered forms the basis of the calculation.

BALLOO'N (*ballone*, a large ball : *Ital.*), in a general sense, means any spherical hollow body; but it more particularly designates a globe made of silk, or other material, rendered air-tight, so that when filled with hydrogen gas, coal gas, or some other elastic fluid lighter than ordinary air, it will ascend into the atmosphere, and convey heavy bodies suspended to it. A car, supported by a network which extends over the balloon, sustains the aeronaut. A valve at the top allows the gas to escape when he wishes to descend; and throwing out a ballast, consisting of sand, makes him ascend. There are two kinds of balloon: the *fire-balloon*, in which ordinary air, made lighter than the surrounding atmosphere by rarefaction produced with heat, is employed: and the *gas-balloon*, in which an air naturally lighter than that of the atmosphere is used. The principle on which a balloon rises in the air is that which makes a cork ascend in the water. The lightness of hydrogen gas very soon suggested its employment in the construction of a body specifically lighter than the atmosphere, and therefore calculated to ascend in it. Many aerial voyages have been effected, but aerostation has made little progress, and probably will never be very successful. Of late, balloons have been made use of for scientific investigations in the upper regions of the atmosphere, and an ascent to the height of five miles above the earth's surface has been effected. The largest balloon built in this country was constructed for Mr. Glaisher's ascents. It had a height of 69 feet and a diameter of 54, and it was capable of holding 95,000 cubic feet of gas.—A fire-balloon is inflated with rarefied air, by burning in the car a quantity of chopped straw, the heated air from which fills it.

BAL'LOT (*ballotte*, from *balle*, a ball : *Fr.*), the method of determining an election by means of small balls, black or white, &c., put privately into a box.

BALLOTA'DE (*ballöter*, to toss : *Fr.*), in Horsemanship, the leap of a horse between two pillars, or upon a straight line, so that, when his fore feet are in the air, he shows nothing but the shoes of his hind feet, without jerking out; differing in that respect from the *capriole*.

BALM (a contraction of *balsam*), in Botany, the name of several aromatic plants. ——BALM OF GILEAD, or Balsam of Mecca, the dried juice of a small tree or shrub growing in Syria, called *Balsamodendron opobalsamum* by botanists: nat. ord. *Amyridaceæ*. It has a warm aromatic taste, and an exquisitely fragrant smell. It is highly esteemed by the Turks as an odoriferous unguent and cosmetic; but its scarcity is such that the genuine balsam is seldom exported as an article of commerce. The American Balm of Gilead is the produce of a tree belonging to the same order.——The Balm of Gilead Fir is a coniferous tree, growing in Canada, the *Abies balsamea* of botanists.

BAL'SAM (*balsamon : Gr.*), an oily aromatic, resinous, or liquid substance, flowing, either spontaneously or by means of incisions, from certain plants, and used in the cure of several kinds of wounds, diseases, &c. The Balsam of Tolu is the produce of the *Myrospermum toluiferum*; the Balsam of Peru, of *Myrospermum peruiferum*; the Balsam of Copaiva, of various species of *Copaifera*, all leguminous trees. ——FACTITIOUS, or ARTIFICIAL BALSAMS, are certain compositions, chiefly of balsamic and healing ingredients, made by apothecaries in imitation of the native balsams.

BA'LUSTER (*balustre : Fr.*), often improperly written *banister*, in Architecture, a small turned column, usually introduced between piers, on the upper parts of large buildings, under windows, and on balconies, &c.

BALUSTRA'DE (same *deriv.*), a series or row of balusters, joined by a rail; serving as well for rest to the elbows as for a fence or enclosure to balconies, altars, staircases, &c.

BAMBOO'. All the species of bamboo, and they are numerous, belong to the family of grasses. Some of them grow to the height of sixty feet, and most of them are very useful to the inhabitants of tropical countries, on account of the number of purposes to which they can be applied. The stems are hollow, more or less flexible, and extremely tough. A group of bamboos waving in the breeze is one of the most graceful objects in nature.

BANA'NA, the fruit of the *Musa sapientum*, a tall herbaceous plant, with broad sail-like leaves, growing in tropical countries. Dampier compares it, when stripped of its integuments, to a large sausage, in size and shape; and to fresh butter in winter, as to substance and colour. Its taste is luscious, and perhaps more resembles that of a pear than any other fruit. [See MUSACEÆ.]

BAND (*bande: Fr.*), in Architecture, any flat, low member or moulding which is broad but not deep.——The BAND OF PENSIONERS, now the band of GENTLEMEN-AT-ARMS, which see.

BAN'DAGE (same *deriv.*), in Surgery, a fillet, roller, or swathe, used in dressing and binding up wounds, restraining dangerous hæmorrhages, and in joining fractured or dislocated bones.

BANDAN'NA, a kind of calico-printing practised in India from time immemorial, by which white or bright-coloured spots are produced on a red or dark ground. By the joint resources of mechanical and chemical science, the European imitations have now far surpassed, in beauty and precision, the Oriental patterns.

BANDIT'TI (outlaws: *Ital.*), a term peculiarly denoting companies of armed robbers, formerly common in Italy and France; but sometimes also used, in a more general sense, for robbers, pirates, outlaws, or others, united for nefarious purposes.

BANDOLEE'R (*bandoulier: Fr.*), a large leathern belt, thrown over the right shoulder, and hanging under the left arm, worn by ancient musketeers, for sustaining their fire-arms and musket-charges.

BANG, the name of a narcotic used in the East, made from the leaf of wild hemp.

BA'NIANS (*banik*, a merchant: *Sans.*), a caste of the Hindoos, whose profession is trade and merchandise; and, in India and Asia, they are the great factors and bankers, as the Jews often are in the West. They believe in the transmigration of souls, and not only abstain from eating the flesh of animals, but endeavour to release even the most noxious from the cruelty of others. They are mild in temper and honest in their dealings, and are so cautious of having communication with any but their own caste, that if one belonging to another nation or tribe has drunk out of or touched their cup, they break it.

BA'NIAN-DAYS, a proverbial expression, imported from the Asiatic colonies, and used for a short or indifferent dinner, or days on which no animal food is eaten: in allusion to the Banians above described.

BA'NIAN-TREE, one of the greatest wonders of the vegetable kingdom, the *Ficus indica* of botanists, a tree growing in India. Every branch shoots downward, and, striking into the ground, takes root, and is then capable of becoming a distinct tree. One of them, the Cubbeer Burr, has 350 stems, equal to large oaks, and more than 3,000 smaller ones, covering space sufficient to shelter 7,000 persons. Its branches are crowded with families of monkeys, and with birds of every description, and also with enormous bats, all of which find luxurious subsistence upon the rich scarlet figs that grow upon it.

BANK (*banco*, a bench: *Ital.*), in Commerce, an establishment for the receiving of moneys and letting them out at interest. It may likewise be defined, a place used as a common repository of the money of individuals or of companies. The basis of all banking is the profitable use to which the banker or company can apply the capital which is deposited. The first bank was established at Venice, about 1157, and the name was given to it, in Italian, from the bench upon which the money-changers or bankers used to sit in their burses or exchanges.

BANK'-NOTE, or BANK'-BILL, a promissory note, issued by a banking company, properly signed and countersigned, payable to the *bearer* in the current coin of the realm, on demand.

BANK OF ENGLAND. In the fifth and sixth years of William and Mary, 1694 and 1695, in consideration of a loan to government of 1,200,000*l.* at an interest of almost eight *per cent.*, a company was incorporated by the name of the 'Governor and Company of the Bank of England,' with a restriction by which it was prevented from dealing in any other than money concerns. The loans to government ultimately amounted to 14,686,800*l.*; but one-fourth of this has since been paid off. The profits of the company arise from the interest received from government on the permanent debt, and on their annual advances on exchequer bills, &c.; from their allowance for receiving the contributions to loans, and for paying the dividends on the public funds; from dealing in bullion, and from their large discounts with a mere paper currency. The Bank receives about 200,000*l.* a year from government for managing the public debt, receiving taxes, &c. To this revenue must be added the profit derived from the use of a floating balance due to the public, and never less in amount than four millions sterling. The affairs of this company are in the hands of a governor, deputy-governor, and twenty-four directors, eight of whom go out of office every year. The 'Bank Parlour' is the room where the directors meet the governor to discuss the affairs of the company. There are about 900 persons employed in the establishment, and the sum paid in salaries is about 210,000*l.* a year. A large amount of bullion is always kept in the vaults. This ranges in value from fourteen to seventeen millions sterling, and on the amount depends the rate of discount, i.e. the rate at which money is lent by the bank on bills of exchange. When the reserve falls the rate of discount goes up. A peculiar paper is made for their notes, and the printing is executed in the bank. There is an ingenious machine for detecting light gold coin, which is separated from the pieces of full weight in the process of weighing.

BANK'ER, one who traffics in money, by receiving the current cash of individuals free of interest, or at a small interest, and negotiating with it, either in the discount of bills, or the advance of money on sufficient securities. The moneyed goldsmiths, in the reign of Charles II., first acquired this name.——The Romans had a similar profession, but its duties were much more extensive than those of bankers among us it united the functions of brokers, agents, bankers, and notaries, managing the exchange, taking in money, assisting in buying and selling, and drawing the writings necessary on all these occasions.

BANK'RUPT (*banco rotto*, a broken bench: *Ital.*). It was a custom formerly observed, in some places, that the seat of the merchant who was found unable to meet his liabilities should be broken: hence the name. In a general sense, a Bankrupt is a person who fails or breaks, so as to be unable to carry on his business or to pay his debts. The policy of the bankrupt law was to distribute all the debtor's property among his creditors, and then to discharge him from all further liability in respect of their debts. This being regarded in the light of a privilege, was formerly allowed only in the case of traders, non-traders not being held entitled to a discharge from existing debts. The system under which the estates of non-trading debtors was wound up was called *insolvency*. The distinction between bankruptcy and insolvency was abolished in 1861, and all persons, whether traders or not, may now be made bankrupt. In all cases, some act of bankruptcy must be committed before a creditor can render his debtor a bankrupt: and an act of bankruptcy is an act of such a nature as evinces an intention on the part of a debtor to deprive his creditors of the security which they might have in the possession of his person or his property. The following are among the chief acts of bankruptcy, common to traders and non-traders. 1. Departing from the realm, or remaining abroad with intent to delay his creditors. 2. Making any fraudulent conveyance of his property.

BANN, in the Feudal law, a solemn proclamation or publication of anything. Hence the custom of publishing the banns before marriage.—In Military affairs, a proclamation made in the army, by beat of drum, sound of trumpet, &c., requiring the strict observance of discipline, the declaring a new officer, &c.—The word *ban* also means an edict of interdiction or proscription. Thus, to put a prince under the *ban* of the empire, was to divest him of his dignities, and to interdict all intercourse and all offices of humanity with the offender.

BAN'NER (*bannière*: *Fr.*), a square flag, or the principal standard belonging to a prince or state.

BAN'NERET (same *deriv.*), an ancient order of knights or feudal lords, who, possessing several large fees, had their own flag or banner. As the spirit of the feudal system declined, persons came to be created bannerets; and hence the institution must have become merely titular. The last knight of this description was Sir John Smith, on whom the honour was bestowed after the battle of Edgehill, for rescuing the standard of Charles I. On the day of engagement, the candidate presented his flag to the king or general, who, cutting off the train or skirt, and making it a square, returned it to him. Hence bannerets are sometimes called knights of the square flag.

BAN'NOCK, a kind of oat-cake, baked in the embers, or on a stone placed before the fire: it is common in Scotland and the northern parts of England.

BAN'QUETTE (a bench: *Fr.*), in Fortification, the elevation of earth behind a parapet, on which the garrison of a fortress may stand, on the approach of an enemy, in order to fire upon him.

BA'OBAB, the name of a tree growing in tropical Africa, the *Adansonia digitata* of botanists, nat. order, *Sterculiaceæ*. It is remarkable for the thickness of the trunk; specimens having been found having a diameter of 30 feet. The tree, however, is not high in proportion. The pulp of the fruit is agreeably acid, and a cooling drink is prepared from it which is useful in fevers. Some specimens of this tree have been supposed to have an age of 5,000 years. The African tree was until lately the only species of the genus, but another species has been discovered in the north-western part of Australia.

BAP'TISM (*baptismos*, from *bapto*, I dip: *Gr.*), a rite of the Christian religion, by which the members of the church are received into its communion. Almost all sects of Christians style baptism a sacrament, and consider its use as important; but the manner in which it ought to be performed, and the effects to be derived from it, have been subjects of much controversy.

BAP'TISTERY (*baptistērion*, from *baptizo*, I baptize: *Gr.*), with Ecclesiastical writers, a place in which the ceremony of baptism is performed. In the ancient church, it was one of the *exedræ*, or buildings distinct from the church itself, and consisted of a porch or ante-room where the persons to be baptized made their confession of faith, and an inner room where the ceremony of baptism was performed. Thus it continued till the 6th century, when the font began to be taken into the church porch, and afterwards into the church itself.

BAP'TISTS (*baptizo*, I baptize: *Gr.*), a denomination of Christians, who deny the validity of infant baptism. In this point, they agree with the *Anabaptists*, with whom, however, they are not to be confounded.

BAR (*barre*: *Fr.*), the partition which separates the members of a court of justice from those who have to report or hear. It is also applied to the benches where the lawyers are seated, because anciently there was a bar to separate the pleaders from the attorneys and others. Hence those who are called to the bar, or licensed to plead, are termed *barristers*, an appellation equivalent to *licentiate* in other countries.—In Heraldry, an ordinary in form of a fesse, but much smaller.—In Law, a plea of a defendant, which is sufficient if true to destroy the plaintiff's action.—In Music, a stroke drawn perpendicularly across the five lines of the stave, the space between each two bars including a certain quantity or measure of time.—**Bar**, a shoal often formed across the mouths of rivers.

BARB (*barba*, a beard: *Lat.*), one of the points in the heads of arrows or fishing-hooks, which prevent them from being drawn out easily.——The name of a horse of the Barbary breed, remarkable for its swiftness.

BARBA (*Lat.*), in Mammalogy, the tuft of hair dependent from the lower jaw.——In Ornithology, the feathers which, in some species of birds, depend from the skin covering the gullet.

BAR'BACAN, or BAR'BICAN, an outer defence to a city or castle, or a watch-tower for observing the enemy; also an aperture made in the wall of a fortress, through which to fire upon an enemy.

BARBA'RIAN (*barbaros: Gr.*), a name given by the ancient Greeks and Romans to all who were not of their own country, or were not instructed in their language, manners, and customs.

BAR'BARISM (*barbarismos: Gr.*), in a general sense, a rudeness of language or behaviour.——In Grammar, an offence against the purity of style or language, or a mode of speaking or writing contrary to the true idiom of any particular language.

BAR'BEL, a fresh-water fish, the *Barbus vulgaris* of naturalists, which takes its name from the processes termed *barbels*, or filamentary appendages about the mouth, of which it has four. It belongs to the carp family, and is therefore allied to the gudgeon, but is distinguished from that fish by the shortness of the under jaw, and by the possession of a strong serrated bony ray at the dorsal fin. It lies in holes near the banks, and feeds on testaceous animals, worms, &c.

BAR'BERRY. [See BERBERIS.]

BAR'BLES, or BARBS (*barba*, a beard: *Lat.*), in Farriery, the knots of superfluous flesh that grow in the channels of a horse's mouth; that is, in the intervals that separate the bars, and lie under the tongue.

BARD (*bardus: Lat.*), the name given to individuals of semi-barbarous tribes, particularly those belonging to the *Celtic* race, whose genius enabled them to describe events in elevated or measured language.

BARGE, a boat of state and pleasure. Also, the name of a flat-bottomed vessel employed for carrying goods on a navigable river.

BARIL'LA, the crude soda of commerce, formerly obtained by burning several species of *fucus* and shore plants, belonging chiefly to the genera *Salsola* and *Salicornia*, and then melting the ashes in a small kiln. Soda is now procured more cheaply from common salt.

BA'RIUM (*barus*, heavy: *Gr.*), a metal so called by Sir Humphry Davy, the discoverer; and obtained by the chemical decomposition of barytes. It has the colour and lustre of silver, but is soon tarnished by the oxygen of the air. It is malleable, and melts below a red heat It decomposes water. Its equivalent is 68·5.

BARK (*bergen*, to cover: *Ger.*), that part of a tree which is external to the wood. When young, it is cellular, and similar to the pith. Afterwards, it is composed of both cellular and vascular tissue, the latter being next the wood, and called *liber*. On the outside of the liber is the cellular envelope, and outside this is the outer covering, or rough bark. It is observed that trees stripped of their bark in the time of the sap, and suffered to die, afford heavier timber, more uniformly dense, stronger, and fitter for service than those which are cut down in their healthy state.

BARK, PERU'VIAN. [See QUININE.]

BAR'LEY, a valuable kind of grain, principally used in England in the state of malt for brewing.——PEARL BARLEY, or *French Barley*, the grain freed from the husk by a mill, and reduced to the size of small shot, all but the very heart of the grain being ground away.——BARLEYCORN, the least of our long measures, being the third part of an inch.

BARM, or YEAST, the head, or working out of beer, which is used as a ferment to lighten bread. By the aid of the microscope it has been found that yeast is a collection of vegetable cells of very rapid growth, in fact a species of fungus.

BAR'NACLE, or BER'NICLE GOOSE, a prettily-marked wild goose, which visits our islands in winter.

BAR'NACLES, the common name of a class of shell-bearing animals, called *Cirripedia*, allied to the Crustacea. Some of the sessile species, called acorn-shells, are common on every shore rock washed by the sea. Examples of the stalked species are to be seen on the bottom of most ships that have been to sea. It was once commonly supposed that these the true barnacles produced the barnacle goose, whence their name.——In Farriery, an instrument composed of two branches joined at one end with a hinge, and put upon a horse's nose, to confine him for shoeing, bleeding, or dressing.

BAR'OLITE (*baros*, weight; and *lithos*, a stone: *Gr.*), or WITHERITE, a ponderous stone, the carbonate of barytes. It usually occurs in small masses, which have a fibrous structure; and it is generally of a light yellowish-grey colour.

BAROM'ETER (*baros*, weight; and *metreo*, I measure: *Gr.*), an instrument for measuring the weight, or rather the pressure of the atmosphere. It is of various forms: the best and most usual is a straight tube of glass hermetically sealed at one end; having been filled with pure mercury, free from air, the open end is closed with the thumb, and it is inverted into a cup of mercury. The column of mercury will descend until its weight just balances the pressure of the atmosphere at the time. The empty space next the upper or closed end is called the *Torricellian vacuum*. The upper surface of the mercury never descends, in ordinary circumstances, more than a few inches; and this space is measured by a scale, aided by what is called a *vernier* [which see]. The real height of the column of mercury is the distance from the *surface* of the mercury in the cup to the upper surface of the column in the tube. This instrument is used for obtaining probable indications of the state of the weather. In dry weather, the air, being free from vapours, is heavy, and forces up the mercury; but in moist rainy weather, the atmosphere being charged with clouds and fogs, the air is lighter, and acts upon it with less effect. From the best observations that have been made on the barometer, it appears, however, that it is not so much the height of the mercury in the tube that indicates the weather, as its motion up and down; hence, in order to know whether the mercury is actually rising or falling, the following rules are of use:—1. If the surface of the mercury is convex, it is a sign that the mercury is then rising. 2. If the surface is concave, it is sinking. 3. If the surface is plain, or rather a little convex, the mercury is stationary. 4. If the glass is small, shake the tube, and if the air is grown heavier, the mercury will rise about half the tenth of an inch; if it is growing lighter, it will sink as much. Prof. Daniell constructed a barometer with water in place of mercury. This liquid being much lighter, requires a longer tube, and the tube of Daniell's instrument was forty feet long. The oscillations of the water are, of course, much more apparent than in a small barometer, and, in unsettled weather, it is very interesting to watch the movements of the liquid. As to the use of the barometer in measuring heights, see HYPSOMETRY; see, also, ANEROID BAROMETER.

BAR'OMETZ, or BAR'ANETZ, the name given to the stem of a woolly fern, when artfully prepared, so as to deceive persons into the belief that the deserts of Scythia contained creatures that were half animal, half plant. The name of Scythian lamb was also given to it.

BA'RON, a member of the lowest order of the nobility with us. Originally, the barons, being the feudatories of princes, were the proprietors of land held by honourable service; hence, in ancient records the word *barons* comprehends all the nobility. It is probable that formerly all those were barons who had lordships with courts-baron, and soon after the Conquest all such sat in the house of peers; but being very numerous, it was ordered that none should sit there but such as the king thought proper to call up by writ, which ran *pro hâc vice tantùm*. This state of nobility being very precarious, they at length obtained of the king letters patent, and were then called barons by patent, or creation. The coronet of a baron has only four pearls, and no leaves. Barons do not appear to have had the privilege of wearing a coronet until the time of Charles II.—— BARONS OF THE EXCHEQUER, the five judges of the court of Exchequer.

BARON AND FEMME (*femme*, a wife: *Fr.*), a term in Law for husband and wife, who are deemed but one person; so that, except under peculiar circumstances, as, for instance, in cases of high treason, or violence to the wife, she cannot be witness for or against her husband, nor he for or against his wife. The queen, whether queen regnant or queen consort, is, however, regarded by English law as a single woman.

BA'RONET, one having the lowest degree of honour that is hereditary. The order of baronets was founded by James I., when in want of money, at the suggestion of Sir Robert Cotton, when 200 were created at once, each of whom paid 1,095*l.*, and undertook to maintain 30 men for three years against the rebels in the Irish province of Ulster. To this number it was intended that they should always be restricted, but it is now enlarged, at the royal pleasure, without limitation. The baronetage of Scotland, of Nova Scotia in America, and of Ireland, was afterwards instituted. All indifferently bear the red hand of Ulster on their coat-armour, and have the right to prefix 'Sir' to their names; their wives being styled 'Lady.'

BAR'RACAN (*Fr.*), a kind of thick, strong stuff, something like camlet, but of a coarser texture. It is used to make cloaks, surtouts, and other outer garments.

BAR'RACKS, large buildings erected for the security and accommodation of soldiers, whether infantry or cavalry.

BARRACU'DA, a species of fish found in the West Indian seas, belonging to the genus *Sphyræna* of ichthyologists. It is sometimes taken ten feet long, and is very voracious.

BAR'RATRY (*baratta*, strife: *Ital.*), in Law, 'the moving and maintaining of suits, in disturbance of the peace, and the taking and detaining the possession of houses, lands, and goods, by false inventions.' It is indictable. In maritime assurance, it is the act of the master or mariners, of a criminal or grossly negligent nature, tending to their benefit, but to the prejudice of the owner of the ship. In Scotland, it is the crime of a judge who receives a bribe.

BARRICA'DE (*Fr.*), or BARRICA'DO, a fortification made in haste, of trees, earth, palisades, wagons, or anything that will obstruct the progress of an enemy, or serve for defence or security against his attack.

BAR'RISTER, a counsellor earned in the law, admitted to plead at the bar, and there to take upon him the protection and defence of clients. Barristers are termed *Juris consulti*; in some countries *Licentiati jure*; and anciently they were called *Apprentices* of the law: in Latin, *Apprenticii juris nobiliores*. In Scotland, they are called *Advocates*. Certain barristers are from time to time appointed to be the counsel of the crown, and are called king's or queen's counsel. These sit within the bar, and take precedence of all barristers not of that dignity. Without special license they cannot be employed against the crown, for example, in defence of persons accused of crimes. Before anyone can apply to be called to the bar, he must become a member of an inn of court, and keep twelve terms there. [See INN OF COURT, SERGEANT-AT-LAW.]

BAR'ROW, a large artificial hillock or mound of earth. Barrows are met with in many parts of the world, and on being opened are found to be repositories of the dead. By the Romans they were called *tumuli*. They are still to be seen in many parts of Great Britain and Ireland, as well as in several other countries. They are the most ancient monuments in the world. In this country, they are chiefly found in the chalk districts of Wilts and Dorsetshire. A mound of stones is usually called a cairn.

BAR'RY, in Heraldry, is when an escutcheon is divided bar-wise (that is, across from side to side) into an even number of partitions, consisting of two or more tinctures interchangeably disposed.

BAR'-SHOT, double-headed shot, consisting of a bar with a half ball or round head at each end; used for destroying the masts and rigging in naval combat.

BAR'TER, the exchanging of one commodity for another, the trucking of wares for wares, among merchants. Barter was the original and natural way of commerce, there being no buying till money was invented.——Also, the rule in Arithmetic by which the proportionate value of commodities is found.

BARYSTRON'TIANITE (a combination of the words *barytes* and *strontian*), a mineral called also *stromnite*, from Stromness, in Orkney. It is of a yellowish-white colour externally, but of a greyish-white within.

BARY'TA, or **BARY'TES** (*barus*, heavy: *Gr.*), the oxide of the metal BARIUM. It is white, and is soluble in water. The native carbonate (BAROLITE, or Witherite) and sulphate are found abundantly in lead mines, and are remarkable for their weight. The latter is frequently in the form of beautiful crystals. All the soluble salts of barytes are poisonous. Barytes and some of its salts are employed by chemists as tests.

BARYTO-CAL'CITE (*barytes*, and *calcium*), in Mineralogy, a mixture of carbonate of baryta, lime, and sulphate of baryta. It is of various forms, and of a grey colour.

BA'RYTONE (*barus*, heavy; and *tonos*, a tone: *Gr.*), in Music, a male voice, the compass of which partakes of the common bass and the tenor, being lower than the latter and higher than the former.

BASALT' (*basaltes: Lat.*), a heavy, stony rock of volcanic origin, and of the Trap series, composed of felspar, augite, and iron intimately mixed, with other minerals embedded, the commonest of which is *Olivine*. It is usually of a black or bluish colour. It is found in sheets of more or less thickness, and of variable width, alternating with the other products of volcanoes. It is frequently found split vertically into angular columns, which vary from the utmost degree of rudeness to columns of a very regular structure, such as are seen at the GIANT'S CAUSEWAY, and Staffa. It is very often the injected rock of a dike, and its tendency to split at right-angles to the cooling surfaces is then clearly shown.

BASALT'INE (last), in Mineralogy, a variety of common hornblende, often found in basalt and volcanic scoriæ.

BAS'ANITE (*basanos*, the touchstone: *Gr.*), in Mineralogy, Lydian stone, or black jasper; a variety of silicious or flinty slate, of a bluish-black colour, interspersed with veins of quartz. It is employed to test the purity of gold.

BASE (*basis*, a foundation: *Gr.*), in Geometry, the lowest side of the perimeter of a figure.—**BASE**, in Architecture, any body which bears another, but particularly the lower part of a column or pedestal. The base of columns is differently formed in different orders: thus, the Tuscan base consists only of a single torus, besides the plinth; the Doric has an astragal more than the Tuscan; the Ionic has a large torus over two slender scotias, separated by two astragals; the Corinthian has two toruses, two scotias, and two astragals; the Composite has an astragal less than the Corinthian; the attic base has two toruses and a scotia, and is proper for either the Ionic or Composite column.——In Chemistry, a term used to denote the metal which, with oxygen, forms an oxide, and the oxide which, with an acid, forms a salt. Thus, in oxide of iron or copper, the iron, or copper, is the base; in sulphate of baryta, baryta is the base.——In Fortification, the exterior side of the polygon, or that imaginary line which is drawn from the flanked angle of a bastion to the angle opposite to it.——**BASE COURT**, any court not of record.——**BASE FEE**, a *qualified* fee, which must be determined whenever the qualification annexed to it is at an end.——**BASE LINE**, in Perspective, the common section or a picture, and the geometrical plane.——**BASE TENURE**, in Law, the holding by villenage or other customary services, as distinguished from the higher tenures *in capite*, or by military service.

BASHAW' (a viceroy: *Turk.*), **PASHA'**, or **PACHA'**, a dignity under the Turkish government. *Bashaw*, used absolutely, denotes the prime vizier; other bashaws, who are generally governors of provinces or cities, being distinguished by the name of the places under their command. The appellation is given by way of courtesy to almost every person of any importance at the Grand Signior's court. The degree of a bashaw's dignity is marked by his bearing one, two, or three horses' tails.

BA'SIL, an aromatic plant of the genus *Ocymum*, of which there are many species, all natives of warm climates: nat. order, *Labiatæ*. The sweet basil is much used by the French in cookery.——**BASIL**, in Carpentry, the slope or angle of a chisel, plane, or other tool.

BASIL'ICA (*basilikos*, royal: *Gr.*), in Architecture, properly the palace of a king, but used to indicate a place where courts of justice were held. Its form was a parallelogram, with a portico at each end; being covered with a roof supported by rows of columns. Some of the basilicas were afterwards used for Christian churches: and many of the latter have, from this circumstance, been termed *basilicæ*.——In Anatomy, the interior branch of the axillary vein, running the whole length of the arm.

BASIL'ICON (same *deriv.*), in Medicine, an ointment consisting of resin, oil, wax, &c.; it was considered a sovereign kind of plaster. The word was also used as an epithet for many other compositions.

BASILI'DIANS (from *Basilides*, their founder), in Church History, a branch of Gnostics, who maintained that Christ's body was only a phantom, and that Simon the Cyrenean suffered in his stead.

BAS'ILISK (*basiliskos: Gr.*), a fabulous kind of serpent, called a cockatrice, said to be produced from a cock's egg, hatched by a serpent, and supposed to kill by its breath or sight only.——A large piece of ancient ordnance.

BA'SIN (*bassin: Fr.*), a hollow vessel for holding liquids.——In Hydraulics, any reservoir of water.——BASIN of a dock, a place where the water is confined by double flood-gates. The *basin of a haven* is that part which opens from a narrow passage into a spacious receptacle.——In Jewish Antiquities, the *laver* of the tabernacle.

BA'SIS (*basis*, a foundation: *Gr.*), in Medicine, the principal ingredient in a composition.——BASIS CEREBRI, in Anatomy, the lower and posterior part of the brain. ——BASIS CORDIS, the superior part of the heart, so called to distinguish it from the apex or small point.

BAS'KING-SHARK, the *Selachus maximus* of ichthyologists, has been frequently taken on the British coasts. It has been known to reach the length of 36 feet. It derives its common name from its habit of lying on the surface of the water and basking in the sun. It produces a great quantity of oil.

BASS (*bas*, low: *Fr.*), sometimes written *base*, the lowest or fundamental part in music, and important as the foundation of harmony. *Counter bass* is a second or double bass, where there are several in the same concert. *Ground bass* is that which commences with some subject of its own, that is continually repeated throughout the movement, whilst the upper parts pursue a separate air. *Thorough bass* is the science of harmony including the fundamental rules of composition. —— BASS, among gardeners, a soft kind of sedge or rush used in binding plants, &c.

BAS'SET, a miner's term, signifying the out-crop or emergence of a stratum at the surface of the earth.

BAS'SO (low: *Ital.*), in Music, the Italian term for *bass*. Thus, *basso concertante* is the bass of the little chorus; *basso ripieno*, the bass of the grand chorus; and *basso continuo*, that part of a composition which is set for the organ, &c.

BAS'SO RILIE'VO (*Ital.*), or BAS-RELIEF, sculpture in which the figures project but little from the plane on which they are formed. Prominent figures are said to be in *relief;* and when the work is low or flat it is called *bas-relief*, or *basso rilievo*, in distinction from *alto rilievo* and *mezzo rilievo.*

BASSOO'N (*bas*, low; and *son*, a sound: *Fr.*), a musical wind instrument, consisting of a very long tube of wood, with a reed for the mouthpiece.

BASTI'LLE, a general name in France, during the middle ages, for works outside a city; but commonly applied to a celebrated fortress in Paris, which was used as a state prison, and in which many persons who had incurred the resentment of the French monarchs or their ministers were immured. It was built at the latter part of the fourteenth century, and was demolished by the enraged populace at the commencement of the revolution, in 1789.

BASTINA'DO (*bastone*, a stick: *Ital.*), a mode of punishment used among the Turks, in which the offender is beaten on the soles of the feet.

BAS'TION, in Modern Fortification, a large mass of earth, usually faced with sods, but sometimes with brick, and in a few instances with stone, standing out from a rampart of which it is a principal part; and what, in ancient fortification, was called a *bulwark.* The bastion consists of two *faces*, and an opening towards the centre, called the *gorge.* Bastions are solid or hollow. A *flat* bastion is made in the middle of the curtain, when it is too long to be defended by the bastions in its extremes. A *demi* bastion is composed of one face only, with one flank and a demi-gorge. A *double* bastion is one raised on the plane of another.

BAT, the name of a family of mammalian animals, the *Cheiroptera* or *Vespertilionidæ*. Their distinguishing feature is that the fore and hind legs are connected by a membrane which spreads over the elongated finger bones, so as to form an apparatus for flying. They are nocturnal animals, with wonderful powers of sight. They are found in all parts of the world. The majority feed upon insects, and only a few upon fruits. Some of them are blood-suckers, and in South America there is at least one species which is troublesome to horses in this way. The family is divided into two sections: those which have upon the noses a leaf-shaped membrane, in which the nostrils are placed; and those which are destitute of such a membrane.

BATH (*bad: Sax.*). Natural warm baths are formed of the water of hot springs, of which there are many in different parts of the world, especially in countries where there are, or evidently have been, volcanoes. The chief natural warm baths in Great Britain are those of Bath and Bristol, in Somersetshire; and those of Buxton and Matlock, in Derbyshire; which latter are merely *tepid.* Some are impregnated with iron, and called *chalybeate;* others with sulphur, carbonic acid, and other mineral substances. They are often very efficacious in scorbutic, bilious, and dyspeptic complaints, as well as for the removal of various chronic diseases. The word *bath* also signifies any artificial contrivance which is to supply the place of a bath, as a *shower bath,* or an apparatus for applying water to the body in the form of a shower; a *vapour bath,* or a mode of conveying moisture to the body by means of steam. Among the ancients, the most magnificent edifices were erected for bathing in; such were the baths of Titus and Diocletian, the ruins of which still remain. At the present day, baths are in general use in the East.——BATH, in Chemistry, an apparatus used in various processes, particularly in distillations, and consisting in the use of different intermedia. When the degree of heat required is below that of boiling water, a vessel containing that fluid is interposed between the fire and the substance to be acted upon; and when a superior degree of heat is necessary, sand, or some other matter of a similar nature, is employed.

BATH, KNIGHTS OF THE, a military order of knighthood in England, supposed to have been instituted by Richard II., who limited the number of knights to four; but his successor, Henry IV., on the day of his coronation, increased them to forty-six. This order received its denomination from a custom of bathing before the knights received the golden spur. The badge or symbol of the order is a sceptre, rose, thistle, and three imperial crowns conjoined within a circle, upon which is the motto, 'Tria juncta in uno,' alluding to the three cardinal virtues—faith, hope, and charity. The order of the Bath, after remaining many years extinct, was revived under George I., in 1725, by the solemn creation of a great number of knights. There are three classes of the order: Knights Grand Cross (G.C.B.), Knights Commander (K.C.B.), and Companions (C.B.). The members of the two first are entitled to prefix 'Sir' to their names. Each class has a civil and military division.

BA'TON (*Fr.*), the staff or truncheon given to field-marshals as a symbol of authority.

BATOO'N, in Architecture, a moulding in the base of a column.

BATRA'CHIANS (*batrachos*, a frog: *Gr.*), an order of amphibious animals, which some naturalists have placed amongst the reptiles. They are divisible into two groups: the tailless and the tailed batrachians. To the first belong frogs and toads; to the second, salamanders and tritons, which run instead of leaping. All the batrachians undergo transformation. When hatched from the egg, they have gills like fishes, a tail, and no legs.

BAT'RACHUS (same *deriv.*), in Ichthyology, the sea-devil, a frog-like fish.——In Medicine, an inflammatory tumour under the tongue.

BAT'TA, allowances made to troops in India. *Dry batta* is money given in lieu of rations; *wet batta*, what is given in kind.

BATTA'LIA (*Ital.*), an army drawn up in order of battle.

BATTA'LION (*bataillon: Fr.*), a body of foot soldiers, consisting of from 600 to 1,000 men.

BAT'TEL, an ancient mode of trial by single combat, which was sanctioned by law, and was introduced into England by William the Conqueror. It was allowed in a civil action, called a writ of right, and also in *appeals*, which were actions by the subject demanding punishment for the crime on account of the private rather than the public injury. In the latter, the combat was between the parties, in the writ of right between the champions. The contest took place before the judges, on a piece of ground enclosed, and the combatants were bound to fight until the stars appeared, unless the death of one party sooner decided the contest. It is but in comparatively late years that this barbarous practice has been abolished.——An account of the expenses, for provisions and liquor, of a student at Oxford.

BAT'TEN (*bâton*, a stick: *Fr.*), a scantling or piece of wood, from two to four inches broad, and one inch thick.

BAT'TERING-RAM, a military machine, with which the ancients effected breaches in fortifications. This engine was variously constructed, and of different sizes; but in general it consisted of a vast beam suspended from a frame, and armed at one end with a head of iron, resembling that of a ram, from the butting of which animal the idea was doubtless derived. This being equally balanced, and furnished with a number of ropes at the extremity opposite to the ram's head, a great number of men threw it forward with violence, and thus, by a repetition of the strokes, the wall against which it was directed was demolished.

BAT'TERY (*batterie: Fr.*), in the Military art, any raised place where cannon or mortars are planted. A parapet covers the gunners and men employed about the guns from the enemy's shot, and is cut into embrasures for the cannon to fire through. A *battery of mortars* is sunk in the ground, and has no embrasures. *Battery d'enfilade*, is one that scours or sweeps the whole length of a straight line. *Battery en écharpe*, is that which plays obliquely. *Battery de revers*, that which plays on the enemy's back. *Cross-batteries* are two batteries which play athwart one another upon the same object, thus forming an angle, and producing great effect, because what one ball shakes the other throws down. A *camerade battery* consists of several guns which play at the same time upon one place. A *ricochet battery*, is one from which the cannon are discharged with a very small quantity of powder, and very little elevation, so as to carry the ball just over the parapet, where it rolls along the opposite rampart, and produces a destructive effect.——BATTERY, in Electricity, is a combination of coated surfaces of glass, commonly jars, so connected together that they may be charged at once, and discharged by a common conductor.——GALVANIC BATTERY, or *Pile*, an apparatus employed for accumulating the electricity of galvanism, which is produced by the natural agencies of certain metallic and carbonaceous substances and peculiar fluids. This instrument was invented by the celebrated Volta, and is often called the *Voltaic* battery. It has, at different times, assumed various forms, each more perfect than the preceding. The earlier species consisted of compound plates of zinc and copper, in cells charged with dilute acids. But the action of such batteries was very transitory. *Constant* batteries were then invented: they were so called from their prolonged action. Many of them are very effective and convenient; but the two kinds most generally used at present are *Smee's* and *Grove's*. The former consists of a very thin sheet of silver platinized—that is, covered all over with metallic platinum in the form of a black powder; at each side of this, but not in contact with it, is fixed a thick plate of zinc amalgamated; that is, well covered with metallic mercury. When this apparatus is immersed in tolerably strong sulphuric acid, there is no action until the zinc plates are connected by a wire or some metallic conductor with the platinized silver; violent action then occurs. Hydrogen in large quantities is given off from all parts of the platinized silver, and electricity is transmitted along the wire or other conductor. Grove's battery, called the *nitric acid battery*, consists of a flat cell of glazed porcelain, containing within it a smaller cell of porous earthenware. A plate of amalgamated zinc is bent, so as to receive the porous cell, and at the same time to lie in the glazed cell. Within the porous cell is a thin plate of platinum. When the glazed cell is charged with a mixture of one part oil of vitriol and six parts water, and the inner cell with strong nitric acid, action commences, as in Smee's battery, on uniting the two metals by a metallic conductor, and electricity is transmitted along the latter. With this battery no hydrogen escapes, as it forms water with some of the oxygen of the nitric acid, which it changes into nitrous. Prof. Bunsen has rendered Grove's battery much cheaper by substituting dense coke for platinum.——**Battery**, in Law, the striking, beating, or offering any violence to another person, for which damages may be recovered. It is distinguished from an *assault*, inasmuch as the latter does not necessarily imply a blow. There may be an assault without battery, but battery always implies an assault.

BAT'TLE-AXE, a military weapon which owes its origin to the Celts. It was not used by the Greeks or Romans, but was very common among the contemporaneous Celts. It was a favourite weapon in England, Scotland, and Ireland; and the Lochaber axe was particularly celebrated.

BAT'TLEMENTS (from *battle*), in Military Architecture, a wall or parapet on the top of a building, with embrasures or open places to look through, or discharge missiles against the enemy.

BATTOL'OGY (*battologia*, idle talk: *Gr.*), in Grammar, a superfluous repetition of some words or things.

BAT'TUE (*battre*, to beat: *Fr.*), in Sporting, the surrounding a portion of a forest, wood, or park, and, by beating the bushes and shouting, endeavouring to bring out the animals intended for the chase.

BAY (*baie*: *Fr.*), in Geography, an arm of the sea extending into the land; it is also often applied to large tracts of water, as the *Bay* of Biscay.——**Bay**, one of the colours of a horse, of which there are various shades.——**Bay**, or **Bay-tree**, the *Laurus nobilis* of botanists, an evergreen which grows wild in the south of Europe. A garland or crown made of bay leaves was awarded, among the ancients, as a prize for victory or excellence.

BAYEUX TAPESTRY, a linen web, 442 feet long, and 2 wide, said to have been embroidered by English women, under the direction of Matilda, the queen of William the Conqueror, the subject being the conquest of England. It is preserved in the cathedral of Bayeux.

BAY'ONET (from *Bayonne*, where it was first invented), a short pointed instrument, or triangular dagger, made to fit on the muzzle of a firelock or musket.

BAY'-SALT, a salt which crystallizes or receives its consistence from the heat of the sun or action of the air.

BAZAR', or **BAZAAR'** (a sale: *Pers.*), a kind of exchange or market-place among the Turks and Persians. Some of these buildings are remarkable not only for their extent, but for their magnificence.——This name has of late years been in use with us to denote certain large buildings containing a collection of shops or stalls, let to different persons, and in which a great variety of 'fancy goods' are exposed for sale.

BDEL'LIUM (*bdellion*: *Gr.*), a name given to certain gum-resins, the produce of different plants. African bdellium, which has a bitter nauseous taste, and a dark-brown colour, is yielded by a composite half succulent plant, called *Ceradia*, which grows in SW. Africa. Egyptian bdellium is produced by a palm, *Hyphæne thebaica*. Another bdellium is obtained from various species of Balsamodendron trees growing in India and Africa.

BEA'CON (*beacn*, to point out: *Sax.*), a signal erected on a long pole, upon an eminence. It consists of a pitch-barrel or other combustible matter, which is fired at night, to notify the approach of an enemy. Also, any object serving as an occasional signal, or as a constant sea-mark, by means of which ships may be warned of danger, or assured of their port.

BEAD (*beade*: *Sax.*), in Architecture, a round moulding, commonly made upon the edge of a board, &c. In the Corinthian and Roman orders, it is cut or carved in short embossments, like beads in necklaces.——**Bead**, in Metallurgy, the small ball or mass of pure metal separated from the scoria, and seen distinct while in the fire.——**Bead-proof**, a term amongst distillers for that proof of the strength of spirituous liquors denoted by the bubbles called *beads*, which rise and remain on the surface of the liquid for some time after it has been shaken.

BEAD'-TREE, a shrub growing in Spain and Portugal; so called, because the nuts which it bears are bored through, and strung as beads by the Roman Catholics of those countries. It belongs to the genus *Melia*.——A **Beadsman** is one who recites prayers for his patron, &c.

BEA'DLE (*bidel*, a public crier: *Sax.*), a messenger, or apparitor of a court, who cites persons to appear and answer in the court what is alleged against them.——A **Beadle** is also a person at a university, whose chief business it is to walk before the university officers with a mace in all public processions, &c. [See **Bedell.**]

BEA'GLE (*bigle*: *Fr.*), the name of a particular kind of hound or hunting-dog, of which there are several sorts.

BEAK (*bec*: *Fr.*), in a general sense, the upper end or point, as the upper part of the bill of a bird.——**Beak-head**, in a ship, a small platform at the fore-part of the upper deck.——**Beaked**, in Heraldry, an epithet in blazoning for birds whose beaks are of a different tincture from their bodies. In Botany, an epithet for the fruit when it is terminated by a process in the shape of a bird's beak.

BEA'KER (same *deriv.*), a drinking cup, so called from its having a spout like a bird's beak.

BEAM, the largest piece of timber in a building, laid across the walls, and serving to support the principal rafters. In ships, beams are the large main timbers that stretch across a ship to support a deck.——In Mechanics, the part of a balance, from the ends of which the scales are suspended. ——BEAM, among Hunters, the main stem of a deer's head, or that part which bears the antlers, royals, and tops.——BEAM-ENDS. A vessel is said to be on her beam-ends when she inclines so much on one side that her beams approach a vertical position.——ABEAM, in a direction perpendicular to the ship's length: amidship.——BEAM COMPASS, an instrument consisting of a square wooden or brass beam, having sliding sockets, and used for describing large circles.——BEFORE THE BEAM, is an arch of the horizon between a line that crosses the ship at right angles, and that point of the compass towards which she steers.

BEAM'-TREE, the *Pyrus aria* of botanists, nat. ord. *Pomaceæ*. This tree grows to the height of thirty or forty feet, and is particularly fitted for making axle-trees and the like.

BEAR (*bera : Sax.*), a family of mammalian quadrupeds, of which there are several species, agreeing in having large stout limbs, large heads, terminating in a prolonged snout; bodies clothed with shaggy hair, and feet furnished with hooked claws. The best-known species are:—1. The brown bear, which subsists chiefly on fruit, vegetables, and honey. 2. The American bear, which is smaller than the other, and feeds in like manner. 3. The Polar or maritime bear, which is only found in high northern latitudes: it is from eight to twelve feet long, of great strength and ferocity, devouring at sea fish, seals, and whales, and on land any animals which it can seize. ——BEAR, in Astronomy, a name given to two constellations called the greater and the lesser bear, or *Ursa major* and *Ursa minor*.

BEARD'ED (*barbatus*), in Botany, having tufts of hair.

BEAR'ER, in Architecture, a post or brick wall placed between the ends of a piece of timber, to support it.——In Heraldry, a figure in an achievement, placed by the side of the shield, and seeming to support it.

BEAR'ING, in Navigation and Geography, the situation of a place with regard to the points of the compass, or the angle which a line, drawn through two places, makes with the meridian of each.——Also a Sea-term found in several phrases; thus, when a ship sails towards the shore, before the wind, she is said to *bear in with the land* or harbour. To let the ship sail more before the wind, is to *bear up*. To put her right before the wind, is to *bear round*. A ship that keeps off from the land is said to *bear off*. When a ship that was to windward comes under another ship's stern, and so gives her the wind, she is said to *bear under her lee*, &c.——BEARINGS, in Heraldry, the coats of arms, or armorial figures, by which the nobility and gentry are distinguished from common persons, and from each other.

BEAT (*beatan*, to beat: *Sax.*), in Military phraseology, a word of various significations, expressive of giving a signal by *beat of drum*. As, 'To beat an *alarm*,' to give notice of danger. 'To beat a *charge*,' to give a signal for charging the enemy. 'To beat the *general*,' to give notice to the troops to march. 'To beat the *reveille*,' to give notice for leaving quarters. 'To beat the *tattoo*,' to give notice for retiring to quarters, as at bedtime. 'To beat the *troop*,' a signal for repairing to colours. 'To beat to *arms*,' to give a signal for the troops to arm themselves. 'To beat a *parley*,' a signal for a cessation of hostilities, to hold a conference with the enemy. These signals are now given with the bugle.——BEAT, in Music, a reversed shake, without a turn.

BEATIFICA'TION (*beatus facio*, I make happy: *Lat.*), an act of the Pope, by which he declares a person beatified or blessed after death, and the first step towards canonization, or the raising of any one to the dignity of a saint. No one can be beatified till fifty years after his death.

BEAT'INGS (*beatan*, to beat: *Sax.*), in Music, the regular pulsative swellings of sound produced in an organ by pipes which are not quite in unison, their vibrations not being exactly simultaneous or coincident.

BEAU MONDE (polished society: *Fr.*), a term implying the gay fashionable world.

BEA'VER (*befer: Sax.*) a mammalian animal belonging to the order *Rodentia*. The common beaver, *Castor fiber*, is a native of Europe and North America, living on the banks of rivers and unfrequented lakes, and remarkable for its ingenuity in building its habitation. It has short ears, a blunt nose, small fore feet, large hind feet, and a flat ovate tail. It walks slowly, swims dexterously, eats sitting on its haunches, and conveys its food to its mouth with its fore paws. This animal is valued both for its fur and for the oil which it yields.——BEAVER, that part of the helmet which defends the sight, and opens in front.

BECHE-DE-MER, or BICHO-DE-MAR, the commercial name of what is called *trepang* by the Malays, marine worm-like animals (*Holothuriæ*, belonging to the class of Echinoderms), which are collected in large quantities in the Eastern archipelago, for the Chinese, by whom they are esteemed a table delicacy. When taken from the sea they are plunged for a few minutes in boiling water, and then dried. Their integuments contain more or less carbonate of lime, in the form of minute plates or spicula.

BED, an article of furniture on which the body is stretched and composed for rest or sleep, and consisting generally of feathers enclosed in a case of tick. The ancient Romans had various sorts of beds, for various purposes: they had their chamber-bed, on which they slept; their table-bed, on which they ate in a recumbent posture. Three persons usually reclined on one bed, and the middle place, as well as the middle bed, was accounted the most honourable. They had also the bed on which they studied, and that on which the dead were carried to the funeral pile.——BED, in general, a hollow place in which anything rests; as, the *bed* of a mortar.——A stratum, or extended mass of anything, whether upon the earth or within it; as, a *bed* of sulphur, a *bed* of sand, &c.——The BED of a *river* is the bottom of a channel in which the stream or current usually flows.——*From bed and board*, in Law, a decree separating man and wife without severing the marriage tie, formerly granted by the ecclesiastical courts. The wife had a suitable maintenance, called alimony, allotted to her out of the husband's estate. It was usually expressed in Latin *a mensa et thoro*. It has been superseded by what is termed a judicial separation.

BEDELL. In the University of Cambridge there are two officers styled Esquire Bedells, whose duties are to precede the Vice-Chancellor with silver maces on all public occasions, to summon members of the Senate to the Chancellor's Court, &c.

BEDOUIN (dwellers in the wide: *Arab.*), nomadic tribes of the African desert, broken up into groups of families varying in number. At the head of each group is a chief called a sheikh, a dignity which is often hereditary for some generations. They are Mahometans.

BEE, a hymenopterous insect, of which there are numerous genera, but the most interesting and useful to man is the honey-bee, the *Apis mellifica* of entomologists. It is justly celebrated for its singular instincts, and highly prized for the valuable products of its industry. The honey-bees live in swarms or societies which amount to from 10,000 to 40,000, and contain three sorts of individuals: the female, or, as she is commonly called, the *queen* bee; the males, or drones; and the *neuters*, or working bees, by some naturalists called imperfect females. A hive usually consists of one mother or queen, from 600 to 800 males, and from 15,000 to 20,000 working bees. The office of the queen bee is to propagate the species; that of the workers to collect the honey, form the cells, and feed the young. Bees are furnished with a proboscis by which they suck the honey from flowers; they swallow this, and when it has undergone a peculiar process in the stomach, they disgorge it into the cells. The pollen of flowers settles on the hairs with which their body is covered, whence it is collected into pellets, by a brush on their second pair of legs, and deposited in a hollow in the third pair. It is called *bee-bread*, and is the food of the larvæ or young. The females and neuters have a barbed sting, attached to a bag of poison, which flows into the wound inflicted by the sting. The season of fecundation occurs about the beginning of summer. It is said that the female, in the spring, lays as many as 12,000 eggs in the lapse of twenty-four days. When a hive is overstocked, a new colony is sent out under the direction of a queen-bee; this is called *swarming*, and three or four swarms sometimes leave a hive in one season. The true honey-bee was originally confined to the old world, but has been transplanted to America.——The HUMBLE BEES (*Bombi*) are well known from their large size and humming noise. Some of the species form their nest low in the ground, others on the surface. They form rude cells of wax, and collect honey for the larvæ.

BEER (*bier: Germ.*), a drink made from malt and hops by the process of brewing.

BEE'TLES (*beetel: Sax.*), insects furnished with a pair of membranous wings, which are folded up when the animal is not flying under a pair of hard wing cases or *elytra*. They form the vast order of *Coleoptera*. They all of them undergo a complete metamorphosis. They issue from the egg in the shape of a grub, which in many species is very destructive to plants and wood. In time they assume the pupa form, and then emerge as perfect beetles. The forms of beetles are very varied; some are so minute as to require the assistance of a microscope in making out the parts, whilst others attain the size of four inches. The majority are plain in colour, but some are very brilliant. The *Scarabæus*, an object of reverence amongst the ancient Egyptians, the lady-bird of children, the cockchafer, the may-worm, the blistering cantharides, the weevils (so destructive to grain), the turnip fly, and the perfect animals of the nut maggot and the glow-worm, all belong to this order. Coleoptera have been divided into four suborders: 1. *Pentamera*, all the tarsi five-jointed; 2. *Heteromera*, four anterior tarsi five-jointed, two posterior four-jointed. 3. *Pseudotetramera*, all the tarsi five-jointed, the fourth very small. 4. *Pseudotrimera*, all the tarsi four-jointed, the third very small.

BEHE'MOTH (*Heb.*), an animal mentioned in the book of Job, which some naturalists suppose to be the same as the river-horse.

BEI'ZA (*beizath*, an egg: *Heb.*), in Hebrew Antiquity, a certain measure in use among the Jews. The beiza was likewise a gold coin of the Persians. When it was asserted that Philip of Macedon owed their king Darius a thousand beizas or golden eggs for tribute money, Alexander the Great refused to pay them, saying that the bird which laid these eggs had flown into the other world.

BELEM'NITE (*belemnon*, a dart; *Gr.*), the fossil *pen*, or internal shell of cuttle fishes. Belemnites, vulgarly called thunder stones, have been found ranging from the lias to the gault, and about 100 species have been described.

BELL (*bel: Sax.*), a hollow metallic body, ranked among the musical instruments of percussion. The constituent parts of a bell are the barrel, the clapper on the inside, and the ear or cannon by which it hangs to a large beam of wood. It is usually made of a composition called bell-metal, which contains three parts of copper and one of tin; and sometimes of cast steel, &c. The sound of a bell consists in a vibratory motion of its parts, much like that of a musical chord; and as the external surface of the bell undergoes alternate changes of figure, it gives that tremulous motion to the air which causes the sensation of sound. Bells are of high antiquity. The blue tunic of the Jewish high-priest was adorned with golden bells; and the kings of Persia are said to have had the hem of their robe adorned with them. They were introduced into English churches about the year 700, and used to be baptized before they were hung. The number of changes may be found by multiplying together the number of bells and all the integers between it and unity. Thus four bells will give 24 changes, since 4, 3, and 2 multiplied together make 24; six bells will give 720; and twelve bells 479,001,600 changes, which, at the rate of twelve per minute, could not be rung in less than nearly 78 years.——TO BEAR THE BELL, to be the first, or the leader: in allusion to the bell-wether of a flock, or the leading horse of a team that wears bells on his collar. Or it may be synonymous with *to bear away the bell*, which is thus explained. Race-courses were formerly called bell-courses, the prize given being a silver bell; therefore, to win the race was 'to bear away the bell.'——BELLS, in Naval language, half-hours of the watch, which are marked by striking the bell at the end of each.

BELLADON'NA, in Medicine, a preparation from the *Atropa Belladonna*, a poisonous plant growing wild in Britain, and belonging to the *Solanaceæ*.

BELLADON'NA LILY, the *Amaryllis Belladonna* of botanists, a bulbous rooted plant, with a handsome flower.

BELLES LET'TRES (*Fr.*), or POLITE LITERATURE, in its most obvious sense, is that description of literature which has a peculiar reference to matters of taste; but according to many writers, the term has a much more extensive signification, and is made to comprehend not merely every elegant acquirement, but nearly every branch of knowledge.

BELL'EVUE (a fine prospect: *Fr.*), a name given in France to small country-seats, or to arched bowers at the end of a garden or park, intended for the enjoyment of fresh air in the shade.

BEL'LIS (*bellus*, fair: *Lat.*), a genus of plants, nat. ord. *Compositæ*, including the common daisy.

BELLOC'ULUS (*bellus*, handsome; and *oculus*, an eye: *Lat.*), in Mineralogy, a precious stone resembling the eye, and formerly on that account supposed to be useful in diseases of that organ.

BEL'LOWS (*blowan*, to blow: *Sax.*), an instrument or machine for blowing fire, so contrived as to draw in and force out air alternately, by enlarging and contracting its capacity. It is used with organs and other pneumatic instruments, to give them a proper supply of air. The air which enters the bellows is compressed when they are closed, and flows with a velocity proportioned to the force by which it is compressed. Bellows of very great power are generally called *blowing machines*. One of the largest known is erected at the smithy in the royal dockyard at Woolwich; it is adequate to the supply of air for forty forge-fires, amongst which are several for the forging of anchors, &c.

BELL METAL, an alloy which, for large bells, is composed of 80 per cent. of copper and 20 per cent. of tin.

BEL-META'LO DI VO'CE (*Ital.*), in Music, an expression for a clear and brilliant-toned *soprano* voice.

BELTS (*balteus*, a belt: *Lat.*), or FASCIÆ, in Astronomy, two zones or girdles round the planet Jupiter, more lucid than the other parts of his body, and terminated by parallel straight lines, sometimes broader, and sometimes narrower, varying both in magnitude and position.

BELU'GA, the genus of cetaceous mammals, to which the white whale belongs. This whale, which yields good oil, inhabits the North Sea, and herds of 40 or 50 may sometimes be seen. Its usual length is from 12 to 18 feet.

BEL'VEDERE (a fine prospect: *Ital.*), a name given in Italy to the small buildings on the tops of palaces or large houses, which are ascended for the enjoyment of a fine prospect and the advantage of a pure air. It is the name also of a part of the Vatican, where the famous statue of Apollo is placed, and which, on this account, is called the *Apollo Belvedere*.

BEN, or PEN, a Celtic word, signifying rock or mountain. Ben Nevis, Scotland: Pen-y-ghent, Yorkshire; Pen-maen-mawr, Wales; and Penzance, Cornwall; are examples.

BENCH, in Law, a seat of justice, as the Queen's Bench at Westminster. Also, the persons sitting on a bench, as a bench of magistrates.

BENCH'ERS, a body of barristers, formally styled Masters of the Bench, in whom the management of each inn of court is vested. It is a self-elected body, and by it calls to the bar are made. The benchers have also the power of disbarring any barrister whose conduct may appear to them to deserve such a punishment.

BEND (*bendan*, to make crooked: *Sax.*), in Heraldry, one of the ten honourable ordinaries, drawn from the dexter or right corner, at the top of the escutcheon, to the sinister base, or left corner, at the bottom. It is supposed to represent a shoulder-belt, or scarf, and to show the bearer to be valiant in war. It is sometimes called a *bend-dexter*, to distinguish it from the *bend-sinister*, which is drawn from the left side of the shield to the right, and signifies illegitimacy.——BENDS, of a ship, are the strongest and thickest planks in her sides, and are reckoned from the water, first, second, or third bend. They have the beams, knees, and foot-hooks bolted to them, and are the chief strength of the ship's sides.

BEND'ING (same *deriv.*), in Seamanship, the tying of two ropes or cables together: thus, to 'bend the *cable*,' is to make it fast to the ring of the anchor; to 'bend the *sail*, is to make it fast to the yard.

BEND'LET (a *dim.* of *bend*), in Heraldry a little bend which is only half breadth.

BENEDIC'TINES, a celebrated order of monks, who profess to follow the rules of St. Benedict. They wear a loose black gown with large white sleeves, and on the head a cowl ending in a point. They are also called *black friars*.

BEN'EFICE (*beneficium: Lat.*), an ecclesiastical living, particularly a rectory and a vicarage. Bishoprics, deaneries, and prebendaries are usually styled *dignities*. In the middle ages the popes assumed feudal rights with reference to ecclesiastical patronage. The assumption of these aroused the jealousy of princes, and was one of the circumstances which led to the Reformation.

BEN'EFIT OF CLER'GY, a privilege, originating in a superstitious regard for the church, by which the clergy were either partially or wholly exempted from the jurisdiction of lay tribunals. It extended in England only to the case of capital felony, and was intended to apply to none but clerical felons. But, by the laws of England, everyone who could read was considered to be a clerk, so that, when the rudiments of learning came to be diffused, almost every person became entitled to this privilege. Clerks in orders were by it discharged on the felonies to which it was applicable, with no other punishment than forfeiture of goods, and might claim the privilege as often as they chose. Laymen were only allowed to claim their clergy once. By the statute of 7 and 8 Geo. IV., c. 28, it was decreed that 'benefit of clergy, with respect to persons convicted of felony, shall be abolished.'

BE'NE PLA'CITO (*Ital.*), in Music, a term denoting that the performer is to exercise his own taste.

BEN'ZINE, or **BEN'ZOLE**, a liquid hydrocarbon, which at 32° F. forms a white crystalline mass. It may be obtained by distilling benzoic acid with lime, but its chief source is coal tar. Having a strong affinity for fats it is employed to remove grease spots from clothes, &c.

BEN'ZOIC ACID, a combination of the compound radical called benzoyl and oxygen, principally obtained from gum-benzoin by sublimation. It is a solid in the form of thin plates or feathery crystals, and it forms salts with the alkalis and some of the metals.

BEN'ZOIN or **BEN'JAMIN**, a dry solid vegetable substance, a combination of benzoic acid and a resin, of a fragrant smell, and produced by an incision in the *Styrax*, *Benzoin*, nat. ord. *Styracaceæ* an Indian tree. It is brought from the East Indies, particularly from Siam and the islands of Java and Sumatra, in masses of various sizes, composed of small granules of a whitish or yellowish colour, with a purple cast on the surface. It is very inflammable, and diffuses a fragrant smell while burning, or when rubbed in the hand. When the benzoin tree is six years old, the natives cut it in several places in an oblique direction, and the benzoin flows out in the form of a balsamic juice, having a pungent taste and an agreeable odour. Benzoin was formerly very much esteemed as an expectorant, and is still often employed in medicine. A cosmetic is also prepared from it, which is much used in France, under the title of *lait virginal*; and the gum is a principal ingredient of court plaster, and of paregoric elixir.——The *Benzoin* of the chemists is a product obtained on distilling bitter almond-oil with lime and oxide of iron.

BER'BERIS, in Botany, a genus of shrubs including the *B. vulgaris*, the *Barberry tree*, a shrub rising to eight or ten feet high, well known as an ornament in our gardens. The leaves have a grateful acid taste; the flowers at a distance yield a pleasant smell, but very near they are rather offensive. The berries are so very acid that the birds seldom touch them; they are used in this country as pickles and preserves. The roots of the shrub boiled in lye give a fine yellow, which is used in Poland for dyeing leather; the bark, with the aid of alum, is used for the same purpose.

BERGAMOT', or **BERGAMOTTE** (*Fr.*), an essential oil obtained from the rind of a citron, the *Citrus bergamium*. It is used in perfumery.

BER'LIN, a kind of chariot, supposed to have obtained its name from the Prussian capital, where it was first made.

BERME, in Fortification, a space of ground left between the rampart and the moat or fosse, designed to receive the ruins of the rampart, and prevent the earth from filling the fosse.

BER'NARDINES, an order of monks, founded by Robert, abbot of Moleme, and reformed by St. Bernard. They wear a white robe with a black scapulary, and when they officiate they are clad in a large white gown with great sleeves, and a hood of the same colour.

BER'RY (*berig*, from *beran*, to bear: *Sax.*), the popular term for a succulent pulpy fruit, containing several seeds or granules, as the gooseberry, &c. It is the *bacca* of botanists.

BERTH, any situation or place where a vessel lies, either at anchor or in a wharf. ——An apartment in a ship where a number of officers or men mess or reside.——Also, the box or place for sleeping at the sides of a cabin, or the place for a hammock.

BER'YL (*berullos: Gr.*), in Mineralogy, the name of a class of crystallized minerals, to which the EMERALD and the precious beryl belong. They contain about 68 per cent. of silica, the rest being chiefly composed of alumina and glucina. Common beryl is of a light green colour, and found in the East Indies, Brazil, Peru, Siberia, &c. It is crystallized in six-sided prisms, which are either perfect or truncated on the edges and angles. It is nearly as hard as the topaz; can scarcely be melted without the addition of some other substance, but with borax fuses easily. It becomes electrical by rubbing, and is found in primitive rocks, accompanied with quartz, felspar, garnet, mica, and topaz.——A beautiful sea-green colour for the use of artists is also prepared under this name.

BER'YL-CRYSTAL, a species of crystal, which, after a certain kind of prayer termed *a call*, was supposed to have the power of showing those who looked into it the past or the future. It was a kind of looking-glass.

BE'TEL, the name of a creeping plant a

for two years, and then perish; their roots and leaves being formed the first year, and their fruit the second.

BIFA'RIOUS (*bifarius*, twofold: *Lat.*), in Botany, denotes that the leaves grow only on opposite sides of a branch.

BIF'ID (*bifidus*, divided into two parts: from *bis*, twice; and *findo* I cut: *Lat.*), in Botany, an epithet for anything cleft in two.

BIG'AMY (*bis*, twice: *Lat.*; and *gamos*, marriage: *Gr.*), double marriage, or the marrying of a second wife or husband while the first is alive, which is felony by statute, and the second marriage is absolutely void.

BIGA'RIUS (*Lat.*, from *bigæ*, a two-horsed chariot), in Antiquity, the charioteer of a two-horsed chariot. Money or medals stamped with this emblem were called *bigati*.

BIGEM'INATE (*bis*, twice; and *gemino*, I double: *Lat.*), in Botany, two-forked: used of a decompound leaf having a forked petiole, with several leaflets at the end of each division.

BIG'OT, a person who is obstinately and unreasonably wedded to a particular practice or opinion; or one who is illiberally attached to any form or system of belief.

BIJU'GOUS (*bijugus*, yoked two together: from *bis*, twice; and *jugum*, a yoke: *Lat.*), in Botany, composed of two pairs of anything. Thus, leaves pinnated with two pairs of leaflets.

BILA'BIATE (*bis*, twice; and *labium*, a lip: *Lat.*), in Botany, two-lipped; an epithet for the corolla and perianth.

BILACIN'IATE (*bis*, twice; and *lacinia*, a lappet: *Lat.*), a term in Botany applied to a leaf when the margin is cut into two segments.

BILAM'ELLATE (*bis*, twice: and *lamella*, a plate: *Lat.*), a term in Botany, used to denote that the part is of the form of a flattened sphere longitudinally bifid.

BIL'ANDER (*bilandre: Fr.*), a small merchant vessel with two masts, rigged in a peculiar manner, but now rarely used.

BILAT'ERAL (*bis*, twice; and *latus*, a side: *Lat.*), in a general sense, denotes something with two sides. Hence, bilateral cognation is kinship both by the father's and mother's side.

BIL'BOES, a punishment at sea, answering to the stocks on land. The offender is laid in irons, which are more or less ponderous, according to the quality of the offence of which he is guilty.

BILE (*bilis: Lat.*), a yellowish-green fluid, secreted by the liver, part of which is accumulated in the gall-bladder, and the rest is conveyed through a canal into the duodenum, where it helps to convert the chyme into chyle. The bile is properly of two kinds, which are distinguished by the names of cystic and hepatic. The *hepatic* bile is thin, almost insipid, and scarcely coloured; the *cystic* bile is thicker, more coloured, and very bitter. The use of the bile is to attenuate the chyle, to mix the oleaginous parts of the blood with the aqueous, to stimulate the intestines, and in part to change the acid of the chyle.

BIL'IARY CAL'CULI, or *gall stones*, concretions formed in the gall bladder, or bile ducts

BIL'IARY DUCTS (*ductus*, a conducting: *Lat.*), in Anatomy, small canals which convey the bile out of the liver into the hepatic duct, which is formed by the blending of these canals into one trunk.

BILINGUAL (*bis*, twice; and *lingua*, a tongue: *Lat.*), that which is written in two languages. The inscription on the Rosetta Stone is bilingual, being in Greek and Egyptian, the latter being copied in the different characters.

BILL (*bille*, to write in a list: *Sax.*), an account of goods sold, with their prices and total cost.——A BILL OF EXCHANGE is an order drawn on a person, requesting him to pay money to some person assigned by the drawer, or to his order, in consideration of value received. The person who draws the bill is called the *drawer;* the person to whom the request or demand is made, is called the *drawee*, or *acceptor*, after he has accepted it; and the person to whom the money is directed to be paid, is called the *payee*. Such a bill is frequently called a *draft*. Bills of exchange are very extensively used in carrying out mercantile transactions, and a large body of law has grown up respecting them.——A BILL OF ENTRY is a written account of goods entered at the custom-house, whether imported or intended for exportation.——A BILL OF LADING is a written account of goods shipped by any person on board of a vessel, signed by the master of the vessel, who acknowledges the receipt of the goods, and promises to deliver them safe at the place directed.——A BILL OF PARCELS is an account, given by the seller to the buyer, of the several articles purchased, with the price of each.——BILL OF SALE, in Law, an instrument in writing, by which the transfer of movables is effected. It may be either absolute or conditional. In the latter case it is usually a kind of mortgage given to secure payment of a debt, or repayment of a loan. To be valid against other creditors, a bill of sale must be registered within twenty-one days from the making thereof. If the goods assigned by a registered or unregistered bill of sale should continue in the possession of the original owner, they will, upon his bankruptcy, pass to the assignees for the general benefit of the creditors.——A BILL OF HEALTH is a certificate, signed by the proper authorities, given to masters of ships leaving ports suspected of being infected with particular diseases. It is of three kinds, *clean*, *foul*, and *infected:* each states the condition of the ship on sailing.——BILL OF RIGHTS, the declaration delivered by the two houses of parliament to the prince of Orange, February 13, 1688, on his accession to the throne, stating what acts of James II. were illegal, and asserting the rights and privileges of the people.——BILL, in parliament, an instrument drawn up by any member, and presented to parliament for its approbation or rejection. Should it be passed into a law, it then becomes an *act* of parliament.——BILL OF EXCEPTIONS; at a trial at *nisi prius*, if the judge is thought to make a mistake in the law, counsel may tender his objections to the judge's ruling, and require him to sign a bill of exceptions, which may be afterwards argued before a Court of Error.

BILLS OF MORTA'LITY, annual registers of the deaths and burials which formerly took place in and near London. These bills were first commenced in 1592, during the period of a great pestilence, when they included 109 parishes, but were not kept regularly until 1603. The ages at which deaths occur were not inserted until 1728.

BI'NARY ARITH'METIC (*binaire: Fr.*; from *binus*, by twos: *Lat.*), that in which two figures or characters, viz. 1 and 0, only, are used; the cipher multiplying everything by 2, as in the common arithmetic by 10: thus, 1 is 1, 10 is 2, 11 is 3, 100 is 4, 101 is 5, 110 is 6, 111 is 7, 1000 is 8, 1001 is 9, 1010 is 10; being founded on the same principles as common arithmetic. This species of arithmetic was invented by Leibnitz, who asserts that it is more expeditious than common arithmetic in discovering the properties of numbers, and in extensive tabular calculations.——BINARY STARS, two stars revolving about each other in regular orbits. They are to be distinguished from double stars which may be only optically so. Upwards of a hundred binary systems have been discovered. [See STARS.]

BIN'NACLE, or BIT'TACLE (*habitacle*, a small dwelling: *Fr.*), a wooden case, containing the steering compass on board a ship. It is fixed near the tiller or wheel, and is lighted at night.

BINOC'ULAR (*bis*, twice; and *oculus*, an eye: *Lat.*), capable of being used by both eyes at once.——BINOCULAR TELESCOPE, a kind of dioptric telescope fitted with two tubes, joined in such a manner that one may see a distant object with both eyes at the same time. Opera glasses are frequently made in this form.——BINOCULAR MICROSCOPE, an instrument with a tube for each eye, employed to obtain stereoscopic views of magnified objects. Several plans have been contrived, but that which has been most successfully carried out in this country is Mr. Wenham's. A small prism is introduced immediately above the object-glass. One half of the rays from the object take the usual course, whilst the other half are reflected by the prism into the second tube.

BINO'MIAL (*bis*, twice; and *nomen*, a name: *Lat.*), a term in Algebra for any quantity consisting of two names or terms, connected together by the sign + or −. Thus $a + b$ and $8 - 3$ are binomials, one consisting of the sum, and the other of the difference of two quantities.

BIOG'RAPHY (*bios*, life; and *grapho*, I write: *Gr.*), the story of an individual's life. When written by himself it is an autobiography (*autos*, himself: *Gr.*).

BIOL'OGY (*bios*, life; *logos*, a discourse: *Gr.*), that branch of scientific enquiry which is concerned with the nature and relations of living bodies. The discovery of the laws by which the beings of the organic world are governed is the object in view.

BIPAR'TITE (*bis*, twice; and *partitus*, divided: *Lat.*), an epithet for anything divided into two parts.

BIQUAD'RATE (*bis*, twice; and *quadratus*, squared: *Lat.*), in Algebra, an obsolete term for the square of the square. 16 is the biquadratic power of 2; for 2 × 2 is 4, and 4 × 4 is equal to 16. The biquadratic *root* of a number is the square root of its square root: thus the biquadratic root of 81 is 3; for the square root of 81 is 9, and the square root of 9 is 3. A biquadratic *equation* is an equation where the unknown quantity of one of the terms has four dimensions.——A *biquadratic parabola*, in Geometry, is a curve line of the third order, having two infinite legs tending the same way.

BIQUIN'TILE (*bis*, twice; and *quintilis*, the fifth: *Lat.*), in Astronomy, an aspect of the planets, when they are distant from each other by *twice the fifth* part of a great circle, that is, 144 degrees.

BIRDS. [See ORNITHOLOGY.]

BIRD'-BOLT (*bolis*, a missile: *Gr.*), a small arrow with three heads, which was discharged at birds from a cross-bow. The bird-bolt is still used as a bearing in coat armour.

BIRD'LIME (*Sax.*), a glutinous substance, made of the bark of holly, which is spread on the twigs of trees to catch birds.

BIRDS'-NEST, EDIBLE, the nest of the *Hirundo esculenta* or Indian swallow, a Chinese delicacy used in soups. Vast numbers of these birds are seen on the seacoasts of China, at certain seasons of the year: they leave the inland country at their breeding time, to build in the rocks on the coast. At one time it was thought that sea-weed furnished them with the matter of the nests; but it is now known that it is secreted by the birds themselves. The nests are of a hemispherical figure, of the size of a goose's egg, and in substance much resemble isinglass. They are esteemed a great luxury, and sell at a high price. [See SWALLOW.]

BISH'OP (*biscop: Sax.*; from *episcopos*, an overseer: *Gr.*), a prelate, or person consecrated for the spiritual government of a diocese. In Great Britain, bishops are nominated by the sovereign, who, upon request of the dean and chapter for leave to elect a bishop, sends a *congé d'élire*, or licence to elect, with a letter missive, nominating the person whom he would have chosen. This recommendation is equivalent to a command; it cannot be neglected without incurring a *præmunire*. The election by the chapter must be made within twelve days, or the king has a right to appoint whom he pleases. The jurisdiction of a bishop of the Church of England consists in collating benefices, granting institutions, commanding inductions, taking care of the profits of vacant benefices for the use of the successors, consecrating churches and chapels, ordaining priests and deacons, confirming after baptism, &c.; these functions depend upon the ecclesiastical law. A bishop of the Church of England, with an English diocese, is a peer of the realm (except in the case of the bishop last appointed), and he has a seat in the

House of Lords by virtue of a barony which he is supposed to have. He is styled 'Right Reverend Father in God,' and addressed as 'My Lord.'

BISHOP'S COURT, an ecclesiastical court in each diocese, the judge of which is the bishop's chancellor, who decides by the civil and canon law; and if the diocese is large, he has his commissaries in distant parts, who hold what are called consistory courts, for matters limited to them by their commission.

BIS'MUTH (*Germ.*), one of the metals, of a reddish or yellowish-white colour, and a crystalline structure. It is moderately hard, and so brittle that it not only breaks into pieces under the strokes of the hammer, but may even be beat into powder. It melts at about 500° F. When strongly heated, it volatilizes, and at a higher temperature burns with a blue flame. Its specific gravity is 9·9. Bismuth is more commonly found in a native state than any other metal. Most metallic substances unite with bismuth, and are rendered by it more fusible than before: hence it is used in making solder, printer's types, pewter, &c. An alloy of 8 parts of bismuth, 5 of lead, and 3 of tin, melts below the temperature of boiling water, and is known as *fusible metal*.

BIS'ON (a buffalo: *Gr.*), in Zoology, the *Bison Americanus*, often erroneously termed the buffalo. It has short black horns, very wide at the base; and on the shoulders is a large hunch, consisting of a fleshy substance, which, with the head, is covered with a long undulated fleece, divided into locks. In winter, the whole body is covered in this manner; but in summer, the hind part of the body is naked. The tail is about a foot long, with a tuft of hair at the end. The fore parts of the body are very thick and strong; but the hind parts are slender and weak. The bison inhabits the interior of North America, and congregates in vast herds on the prairies. It is a congener of the European BONASSUS.

BISSEX'TILE (*bissextilis:* from *bis*, twice; and *sextus*, the sixth: *Lat.*), or LEAP-YEAR, a year happening every fourth year, and every *fourth* hundredth year, and consisting of 366 days, on account of the addition of a day in the month of February, which then consists of 29 days. This day is added to include the nearly six hours which the sun takes up in his course, besides the 365 days allowed for it in other years. According to the Roman method of counting the days of the months, the 24th of February was called *Sexto Calendas Martii* (the sixth day before the calends of March): and when the calendar was corrected by J. Cæsar, the day added every fourth year was inserted in February; but to prevent interruption in the order of counting the days, the 24th of February was taken twice, the inserted day being named *bis* sexto Calendas Martii (the second sixth day before the calends of March). As the year does not consist of quite six hours more than 365 days, adding a whole day *every* fourth year would gradually cause another error, like that removed by the Gregorian correction [see CALENDAR]; and to prevent this, only the hundredth years whose numbers are divisible by 4, are leap-years. Thus, 1600 was a leap-year because 16 is divisible by 4; 1700, 1800, and 1900 are not leap-years, since 17, 18, and 19 are not divisible by 4; but 2000 will be a leap-year, since 20 is divisible by 4.

BIS'TORT, or *Snake-weed*, a species of *Polygonum* (*P. bistorta*), the roots of which afford an astringent decoction, which is variously applied in medicine.

BIS'TOURY, a small surgical knife of various forms, according to the purpose for which it is intended.

BIS'TRE, or **BIS'TER**, a pigment prepared from the soot of wood, especially the roots of beech.

BISUL'PHURET (*bis*, twice; and sulphuret), in Chemistry, a sulphuret with a double proportion of sulphur.

BIT (*bitan*, to make an incision: *Ang. Sax.*; when used for the iron of the bridle, it comes from *bite*), in Carpentry, a boring instrument, so constructed that it may be taken out of the handle.——Also, the iron attached to the bridle, which is put into the horse's mouth.

BITT, a sea term for the two upright pieces of timber, with a cross piece, to which the anchor cable, ropes, &c., are attached.

BIT'TERS, preparations from plants containing bitter principles, such as gentian Bitters are accounted stomachic and cleansing, and are considered to assist digestion; but their frequent use is injurious.

BIT'TERN, in Ornithology, the English name of the *Ardea stellaris*; it is about the size of the common heron. It haunts marshy places, and feeds at night. During the breeding season it makes a loud booming noise. It is allied to the storks and herons.——BITTERN (from its taste), in the salt works, is the brine remaining after the common salt is removed. It is used in the preparation of *Epsom salt*, the sulphate of magnesia, and of *Glauber's salt*, the sulphate of soda.

BIT'TER-SWEET, or *Woody Nightshade*, the *Solanum Dulcamara* of botanists, a British wild plant, with narcotic foliage, and dangerous berries.

BITU'MEN (*Lat.*; from *pitta*, pitch: *Gr.*), a combustible mineral, which is greasy to the touch, and if ignited emits a strong odour. True bitumen discloses no trace of organic structure, but it was probably derived from deposits of coal by the action of subterranean heat. Asphaltum is a form of bitumen, and *mineral caoutchouc*, or elastic bitumen, is another. Mineral tar is soft bitumen, and the liquids petroleum and naphtha are essentially the same substance.

BI'VALVE (*bis*, twice; and *valva*, the fold of a door: *Lat.*), an epithet given to molluscs which have two shells like the oyster and cockle, and also to such seed-pods as split in two through their whole length like the pods of the bean and pea.

BIV'OUAC, in Military affairs, a night-guard, performed by the whole army, when there is any apprehension of danger from the enemy; or an encampment in the open air.

BIX'A (*South Amer.*), in Botany, a genus of plants, nat. ord. *Flacourtiaceæ*, including the tree from which the colouring matter called **ANNOTTO** is obtained.

BLACK (*blac: Sax.*). Nearly all the rays which fall on black bodies are absorbed, instead of being reflected, hence the sensation of blackness. There are several species of black used in painting; as *Frankfort black*, of which there are two sorts, one a natural earth inclining to blue, and the other made from the lees of wine, &c., burnt, washed, and ground: *lamp black*, the smoke of resin, prepared by heating the resin in iron vessels; *ivory black*, made of burnt ivory, and used in miniatures; *Spanish black*, made of burnt cork, and first used by the Spaniards.

BLACK'-BOOK, a book kept in the exchequer of England, containing a description of that court, its offices, ranks, privileges, perquisites, and jurisdiction, with the revenues of the crown, in money, grain, and cattle. It is said to have been composed in 1175, by Gervais of Tilbury.——**BLACK-BOOK**, that compiled by the visitors under Henry VIII., giving an account of the enormities committed in convents.

BLACK'-CAP, a British song-bird, the *Motacilla atricapilla*, or mock-nightingale; so called from its black crown.

BLACK DEATH, the name given to a frightful epidemic, which in the fourteenth century swept away one quarter of the population of the old world within four years (1347-1350); and in England carried off one-half of the inhabitants. Altogether it is estimated that 25 millions of persons died. It originated in the East, and being attended with the breaking out of black spots over the body, it received the name which stands at the head of this article. The tongue and mouth also became black, whilst inflammatory boils appeared in great numbers. The pestilence was highly contagious, and almost everyone attacked died at farthest in three or four days, and many did not live more than twelve hours. Even dogs, cats, and other animals fell victims. The only king who died of it was Alphonso XI. of Castille. Boccaccio, in his 'Decameron,' has given a vivid description of the pestilence at Florence.

BLACK LEAD, otherwise called *Plumbago* and *Graphite*, is a mineral substance, composed almost entirely of carbon, with a minute quantity of iron intermixed. It is used in making pencils, in forming a composition for crucibles, and in covering the surface of iron utensils to preserve them from rust and give them a good appearance. It has a dark iron-black colour, a metallic lustre, and a thin slaty fracture; it is found in separate loose pieces of a fine grain, which are very soft, and leave, as is well known, dark traces on paper by friction. It is obtained chiefly in Cumberland, and forms a very valuable article of commerce. Recently a large deposit has been found in Siberia.

BLACK'-LETTER, the old English, or modern Gothic characters, introduced into England about the middle of the fourteenth century; the character generally used in manuscripts before the art of printing was publicly practised.

BLACK'-MAIL (*mail* rent, from an old kind of small money, called *maille*), a certain rate of money, corn, or cattle, anciently paid, in the north of England, and in Scotland, to certain persons connected with the moss-troopers or robbers, to be protected by them from pillage.

BLACK'-THORN, or **SLOE-TREE**, the *Prunus spinosa* of botanists. It is much used for hedges, its branches being armed with sharp strong spines.

BLAD'DER (*blædr: Ang. Sax.*), a thin membranous bag in animals, serving as the receptacle of some liquid: as the urinary bladder, gall bladder, &c.

BLANCHIM'ETER (*blancheur*, whiteness: *Fr.*; and *metreo*, I measure: *Gr.*), an instrument for measuring the bleaching power of chloride of lime, &c.

BLANCH'ING (*blanchir*, to whiten: *Fr.*), the art of making anything white, as (in Cookery) the blanching or peeling of almonds, or, as (in Horticulture) the method of whitening salads. Blanching *money* is the annealing, boiling, and cleansing it when it is coined. Copper is blanched in various ways, so as to make it resemble silver. Blanching is also the operation of covering iron plates with a thin coat or crust of tin.

BLANK (*blanc*, white: *Fr.*), a void space in any writing or printing. The word is applied in various ways, usually in the sense of destitution, or emptiness.

BLAN'KET (*blanchet: Fr.*), a warm woollen stuff, light and loosely woven; chiefly used in bedding.——**BLANKETS**, a sea term for combustibles made of coarse brown paper steeped in nitre, dried, and then steeped in tallow, resin, and sulphur. They are used in fire-ships.

BLANK VERSE, in Poetry, that which is without rhyme.

BLAST'-FURNACE, a large conical or quadrangular building, used at iron works for smelting iron-stones and ores. The outer stack is composed of stone or brick, covering a casing of masonry 14 inches thick, which, when the furnace requires to be renewed inside, can be taken down and rebuilt without injuring the outer fabric. A space of about six inches is compactly rammed with river sand, which is a bad conductor of heat. Lastly, there is a coating of fire-brick 14 inches thick. The total height is from 40 to 50 feet. When in full work it will contain 100 tons of material. A powerful blast of air is sent in at several places through tubes called tuyeres. One of the greatest improvements ever made in the manufacture of iron was the use of the *hot blast*, the effect of which, in fusing refractory lumps of cast iron, was discovered by accident about the year 1827. It is evident that a large quantity of cold air thrown upon a body at a high temperature must have an enormous cooling effect. The use of the hot blast causes a great saving, by allowing the use of coal where coke was formerly employed: and refractory ores not formerly smelted can now be profitably worked

BLAS'TING (*blæst*, to blow : *Sax.*), among miners, the splitting and tearing up of rocks, &c., by the force of gunpowder.

BLA'ZONRY, or BLA'ZONING (*blasen*, to blow : *Germ.*), in Heraldry, the art of expressing in proper terms all that belongs to coats of arms. This term is used, because the herald blew a trumpet, and called out the arms of a knight, when he entered the lists at a tournament. Blazonry requires a knowledge of the *points* of the shield—that is, the *tinctures* forming the ground of the coat, the *charges* or devices borne on the field, and the *ordinaries*. [See HERALDRY.]

BLEACH'ING (*bleichen*, to bleach : *Germ.*), the process of whitening linen by exposure to the sun and air, or, as is now more usual, by the application of chemical preparations, such as chlorine. Cotton is more easily bleached than linen. Wool is bleached by the fumes of burning sulphur or sulphurous acid ; also silk and straw.

BLEIME, in the Veterinary art, an inflammation arising from extravasated blood between the horse's sole and the bone of the foot towards the heels.

BLENDE (*blendan*, to mix : *Ang. Sax.*), in Mineralogy, *black jack*, a native sulphuret of zinc : one of its ores.

BLIGHT (*blihtan*, to alight : *Ang. Sax.* The term is specially applicable when it is caused by insects). A general name for various distempers incident to plants, corn, fruit-trees, &c. : the whole plant sometimes perishing by it, and sometimes only the leaves and blossoms, which will be scorched and shrivelled up, the rest remaining green and flourishing. The chief cause of blights seems to be a continued dry easterly wind, for several days together, without the intervention of showers or any morning dew. Another cause of blights in the spring is sharp hoar frosts, which are often succeeded by hot sunshine in the daytime : this is the most sudden and certain destroyer of fruits that is known. A third kind originates in *fungi*, which attack the leaves or stems of herbaceous and woody plants, and more particularly the most useful kinds of grain. These are variously known to farmers by the name of *red rust*, *red gum*, &c. Another cause consists in insects.

BLI'NDNESS (*blind*, to stop : *Ang. Sax.*), a total privation of sight, arising from an obstruction of the functions of the organs of sight, or from an entire deprivation of them. The causes of blindness are various, proceeding from cataracts, gutta serena, &c. There are also kinds of periodical blindness, as a defect of sight in some towards night, in others only in the day : the former of which is termed *nyctalopia*, the latter *hemeralopia*.

BLINDS (same *deriv.*), in the Military art, a sort of defence made of osiers or branches interwoven, and laid across two rows of stakes about the height of a man, and four or five feet asunder : used particularly at the heads of trenches, where they are extended in front towards the glacis, in order to shelter the workmen, and prevent their being overlooked by the enemy. The word *blinds* is, in fact, used to denote all preparations which are intended to intercept the view of the enemy ; and they are, of course, variously constructed, according to the situation or means of providing them.

BLI'NDWORM, or SLOWWORM, the *Anguis fragilis* of naturalists, a harmless British reptile, having very small eyes and a slow motion. It feeds on worms, snails, and insects, and is torpid during the winter.

BLIS'TER, a pustule in the skin, filled with serum.——In Medicine, the plaster or application that raises a blister, usually made of cantharides, or Spanish flies.

BLOCK (*belican*, to shut : *Ang. Sax.*), a sea term for a pulley, or series of pulleys, mounted in a frame, or shell, and serving to facilitate the passage of the ropes. The *blocks* now used in the navy are made in Portsmouth, by means of circular saws and other machinery of most ingenious construction, by which the several operations from the rough timber to the perfect *block* are performed in the completest manner possible : the whole being worked by means of a steam-engine. The block-making machine, as it now exists at Portsmouth dockyard, unites the action of fifteen different machines in one—nine for the shell, and six for the sheaf ; and ten men do the work of 110. It makes about 214 sorts and sizes of blocks ; viz. 72 sizes of thick blocks, 48 of thin blocks, ten of clewline blocks, 20 of sister blocks, 20 of topsail blocks, 24 of fiddle blocks, and 20 of jack blocks. The machines make 1420 blocks of different kinds a day.

BLOCKA'DE, in Military affairs, the blocking up a place, by posting troops at all the avenues leading to it, to keep supplies of men and provisions from getting into it, and by these means starving it out, without making any regular attack. Unlike a siege, it does not require trenches. In International Law, it is the right to exclude neutrals from the ports of an enemy ; but it is not justifiable unless it can be maintained effectually.——To *raise a blockade*, is to force blockading troops to retire.

BLOOD (*blut : Germ.*), a red fluid circulating through the arteries, veins, and other vessels of animal bodies ; serving for the support of life, and the nourishment of all their parts. It is found in the mammalia, in birds, in reptiles, and in fishes ; but in the last two classes of animals its temperature is much lower than in the former, for which reason they are termed *cold-blooded*. The average quantity in an adult man is about 28 lbs. Blood is of two kinds, *arterial* and *venous* : the former being nearly scarlet, the latter a dark crimson. The bright red colour is produced by the action of the atmosphere in the lungs ; and the change will take place even out of the body. All the blood takes its origin from the chyle, and deposits, by degrees, the nourishing particles requisite to the preservation and growth of the body. When examined with the microscope, blood is seen to consist of : 1, a transparent fluid, called *serum*, which chiefly consists of albumen and fibrin mixed with water; and 2, a great number of minute discs which make up the red part of the blood; though under the microscope they are pale and transparent. In most of the mammalia, these corpuscles are round discs; in the reptiles they are elliptical. As to the circulation of the blood, see AURICLE and HEART.—— BLOOD, in LAW, the relationship required in descent of lands; for a person must be next and most worthy of blood in order to inherit his ancestor's estate. A kinsman of the *whole blood* is one who descends from the same couple of ancestors; of the *half blood*, one who descends from one of them only.

BLOOD'-HORSE, one belonging to the breed of horses originally from the Arabian stock, the excellence of which consists in compactness of fibre, that adds to strength without increasing bulk.

BLOOD'HOUND, a hunting dog, of such exquisite scent that it will follow the track of men as well as of the lower animals. It is the *Canis sagax* of Linnæus.

BLOOM, a mass of iron which has undergone the first hammering, called *blomary*.

BLOW'ING MACHI'NES. The earliest and still a very usual form of blowing machine, is some modification of the ordinary bellows. When a constant blast is required, a receiver for the air, independent of the mere bellows, properly so called, is required; as in the smith's bellows. A very powerful kind of blowing machine consists of a cast-iron cylinder like that of a steam-engine, a piston, valves, &c. It acts as a large air-pump, the air being drawn from the atmosphere, and forced to where it is wanted by the arrangement of tubes and valves. The *fan* is another and very convenient form of blowing machine. A wheel, consisting of leaves instead of spokes, is put into rapid motion. The air which is drawn into the centre of the machine by the vacuum produced within it, is driven out through an aperture made for the purpose, by the tangential force caused by rapid rotation; and it passes with great velocity through a tube intended to convey it where it is to be used.

BLOW'PIPE, in Chemistry and Mineralogy, a wind apparatus used to increase the heat of a candle or lamp, in the same manner as a pair of bellows is employed for raising the temperature of a common fire or furnace. It is made of brass; and its most simple form is that of a tapering tube, about eight inches in length, and curved, nearly at right angles, within two inches of its smaller extremity, which is very slender and has a perfectly round aperture. The use of the blowpipe, both to the artist for the purpose of enamelling, and of softening and soldering small pieces of metal, to the glass-blower for making thermometers and other glass instruments, to the chemist and mineralogist for the examination of substances, and indeed whenever it is required to subject a small body to a strong heat, is very important.

BLUB'BER, the cellular membrane which contains the fat or oil of the whale. It varies in thickness from eight to twenty inches. The oil is extracted by cutting up the blubber and placing it on racks above casks into which the oil drains. Sometimes as many as 100 tons of oil are obtained from a single whale.——SEA-BLUBBER, a vulgar name for some of the *Medusidæ*, SEA JELLIES.

BLUE (*blau: Germ.*), one of the colours into which white light is decompounded when refracted through a prism. It is usually considered one of the three primitive colours, out of which all others may be formed. Blue, as a colour in painting, is distinguished into *ultramarine*, formerly made from the azure stone called *lapis lazuli: Prussian blue*, a colour next to ultramarine for beauty; *blue ashes*, used in fresco and miniature; *blue verditer*, a blue somewhat inclined to a green; and *bice*, which is the palest of all the bright blues. In dyeing, the principal ingredients for giving a blue colour are *indigo* and *woad*.

BO'A CANI'NA (*caninus*, pertaining to a dog: *Lat.*), a snake of South America, of a beautiful form, and about four feet long: the head of the animal is large and is furnished with long teeth, with which a dangerous bite can be inflicted, although it does not possess poison fangs. Its colour is green with white stripes.

BO'A CONSTRIC'TOR (*constringo*, I bind together: *Lat.*), the largest of the serpents, from twenty-five to thirty feet long, very ferocious, and so strong that, by coiling itself round the bodies of deer and other animals, it breaks their bones; after which it swallows them whole. The true boas are from South America; the large serpents brought into this country, though called *boa constrictors*, are generally *pythons*, obtained from Asia.

BOAT'SWAIN, the officer who has the boats, sails, anchors, and cables committed to his charge, and who directs whatever relates to the rigging of a ship.

BODE, LAW OF, an empirical law, the suggestion of which is ascribed to Prof. Bode, of Berlin, as to the progressive distances of the planets from the sun. Taking the distance of Mercury from the sun to be 4, the distance of Venus may be represented by 7, that is, 4 plus 3; the distance of the earth by 10, that is, 4 plus twice 3; the distance of Mars by 16, that is, 4 plus 4 times 3, and so on. This law of progression, however, is not strictly exact in numerical verification, and, in the case of Neptune, it is strikingly contravened, since its distance from Uranus is hardly more than one-fourth of what this law would make it.

BO'DY (*bodig: Sax.*), in Physics, an extended solid substance, of itself utterly passive and inactive, indifferent either to motion or rest.——BODIES, REGULAR, the name of five solids, consisting of the tetrahedron, or pyramid, with four triangular faces; the hexahedron, or cube, with six square faces; the octahedron, with eight faces; the dodecahedron, with twelve; and the icosahedron, with twenty faces.

BOG-ORE, oxide of iron sometimes found at the bottom of peat mosses.

BOIL'ING, or EBULLITION (*ebullio*, I boil up: *Lat.*), the bubbling up of any fluid. The term is most commonly applied to that bubbling which happens by the application of heat; though that which ensues in other cases, as on the mixture of an acid and carbonate, is sometimes also distinguished by the same name. Boiling, in general, is occasioned by the discharge of an elastic fluid through that which is said to boil; and the appearance is the same whether it is common air, carbonic acid, or steam that passes through the fluid. The boiling of water is occasioned by the lowermost particles being rarefied into vapour on account of the vicinity of the bottom of the containing vessel to fire. Being greatly inferior in specific gravity to the surrounding fluid on account of this rarefaction, they ascend with great velocity, and, agitating the body of water in their ascent, give it the tumultuous motion called boiling. Every liquid has a fixed point at which boiling commences, and this is called the *boiling point.* Thus water, in ordinary circumstances, begins to boil at the temperature of 212°. After a liquid has begun to boil, it will not become hotter; for although a stronger heat makes all liquids boil more rapidly, yet it does not increase their temperature, the additional heat being required to raise the extra quantity of vapour to the same temperature as that of the fluid from which it ascends: since gases and vapours require a greater amount of heat to keep them at a given temperature than fluids or solids. The boiling point of ether is 96°, that of alcohol is 176°, that of oil of turpentine is 316°, and that of mercury 662°.

BOLE (*bōlos*, a lump of earth: *Gr.*), an argillaceous earthy mineral, a silicate of alumina generally reddened by oxide of iron. Boles are soft and unctuous to the touch: they adhere to the tongue, and by degrees melt in the mouth, producing a slight sense of astringency. There is a great variety of these earths; which have been found in Britain, on the continent of Europe, and in India. They are no longer employed medicinally with us. In Germany a red paint is made from bole by calcining it.

BOLE'TUS (*Lat.;* from *bōlites*, a mushroom: *Gr.*), in Botany, a genus of fungi, one species of which, *B. edulis*, is esteemed as a delicate article of food.

BOL'LARDS (*bolle*, a round body: *Germ.*), large posts set in the ground, on each side of a dock: on docking or undocking ships, large blocks are lashed to them; and through these blocks are reeved the transporting hawsers which are to be brought to the capstans.

BOLO'GNIAN STONE, a *sulphate of baryta* found near Bologna in Italy, which, when heated with charcoal, becomes a powerful *solar phosphorus;* giving out light, after having been exposed to the sun's rays.

BO'LSTER (*polster*, from *polstern*, to stuff with hair or feathers: *Germ.*), a sea term, for a piece of timber cut and placed for the easement of the cable.

BOLT, among builders, a strong cylindrical pin of iron or some other metal, used as a fastening for doors and windows. Bolts are generally distinguished into three kinds, viz. plate, round, and spring bolts.——In Gunnery, there are prise-bolts transom-bolts, traverse bolts, and bracket-bolts.——In ships, bolts are used in the sides and decks, and have different names, as eye bolts, ring-bolts, chain-bolts, &c.

BO'LT-HEAD, in Chemistry, a long straight-necked glass vessel for distillations, which being fitted to the alembic or still, is called a *receiver.*

BO'LUS (*bōlos*, a lump of earth: *Gr.*), in Medicine, a very large pill, to be swallowed whole.

BOMB (*bombos*, a sound imitative of the sense: *Gr.*), a large shell or ball of cast-iron, round and hollow, with a vent to receive a fusee, and filled with combustible materials: the fusee, which is inserted in the vent, being set on fire, the bomb is thrown from a mortar, in such a direction as to fall into a fort, city, or enemy's camp, when it bursts with great violence, and often with terrible effect, blowing into pieces whatever may be in its way. At present, it is often made so as to explode on striking an object. Bombs, or, as they are commonly called, *shells*, seem to have been first used as part of the regular material of an army, about the year 1634, in the wars of the Netherlands.——BOMB-CHEST, a chest filled with bombs, or gunpowder only, and placed underground, in order to effect great destruction when it bursts.——BOMB-KETCH, a small vessel constructed for throwing bombs into a fortress from the sea.

BOMBAST' (*bombax*, an exclamation of mock admiration: *Gr.*), in Literary composition, an inflated style, by which, in attempting to raise a low or familiar subject beyond its rank, the writer seldom fails to be ridiculous.

BOM'BAX (*bombux*, a silkworm: *Gr.*), in Botany, a genus which includes the silk cotton trees, tropical plants of noble aspect. The seeds are enveloped in cottony fibres, but they cannot be made use of for spinning. They are natives of India and America, and belong to the nat. ord. *Sterculiaceæ.*

BOM'BAZINE (same *deriv.*), a fabric, of which the *warp* is silk, and the *weft* worsted. It is generally black, and used for mourning.

BOM'BYX (*bombux: Gr.*), in Entomology, the genus which includes the common SILKWORM, *B. mori.*

BONAS'SUS (*bonassos: Gr.*), or Aurochs, the European bison, the *Bison Bonassus* of naturalists, a fierce animal, which is wild in the Caucasus and some other parts of Europe.

BOND (*Sax.*), a legal obligation to perform a certain condition under the penalty of paying a sum of money.——BOND, in Carpentry, the binding of any two pieces together by tenoning, mortising, &c. In Masonry, it is the disposition of stones or bricks in a building, so that they are most effectually bound to one another.——*Bond-timbers* are the horizontal timbers bedded in stone or brick walls for strengthening them.

BONE (*ban: Ang. Sax.*). The bones are covered with a thin, strong membrane, called the *periosteum*, which has very little sensibility in a sound state, but when inflamed is extremely sensitive. Bones are traversed longitudinally by small canals which contain blood-vessels. These are known as Haversian canals. When a thin section of bone is examined under a microscope, many dark spots are seen with lines radiating from them. These are called *lacunæ* and *canaliculi.* The osseous substance is usually arranged in laminæ concentric with the Haversian canals. In the vertebrata, the middle of the long bones is filled with marrow. In some birds the bones are hollow. From the analysis of bones we learn that, although the proportion of ingredients varies in different animals, the general constituents of bone are as follows: 1. Gelatin, obtained by boiling rasped or bruised bones in water; 2. Oil or fat, separable during the boiling, by rising to the top of the water, and when cold concreting into a suet; 3. Phosphate of lime, carbonate of lime, carbonate of magnesia, and fluoride of calcium. Of these ingredients the phosphate of lime exists in far the greatest abundance, and it is this which gives bones their solidity. Man has 246 bones—the head and face 63, the trunk 59, the arms 64, and the lower extremities 60. That part of anatomy which treats of the bones is called *Osteology.*

BONI'TO, a fish of the tunny genus, growing to the length of three feet, and found in the Atlantic Ocean. It is marked with four dark bands on each side.

BON'NET (a cap: *Fr.*), in Fortification, a small work composed of two faces, usually raised before the salient angle of the counterscarp.

BONZE, an Indian priest, who wears a chaplet of beads about his neck, and carries a staff, having a wooden bird at one end. The bonzes of China are the priests of the Fohists, or sects of Fohi; and it is one of their established tenets, that there are rewards alloted for the righteous, and punishments for the wicked, in the other world; and that there are various mansions, in which the souls of men will reside, according to their different degrees of merit. The number of bonzes in China is estimated at fifty thousand, and they are represented as idle dissolute men. They profess celibacy, reside in monasteries, perform penances, practise rigorous mortifications, and wear long coarse gowns bound with cords, like the Franciscans.

BOO'BY, a species of gannet common on the coast of South America, so called from its stupid habits. Like the Solan goose, it belongs to the genus *Sula.*

BOOK (*boc: Ang. Sax.*), a literary composition, designed to communicate something which the author has invented, experienced, or collected, to the public; being printed, bound in a volume, and published for that purpose.——Plates of lead and copper, the bark of trees, bricks, stone, and wood, were among the first materials employed to engrave such things upon as men were desirous of transmitting to posterity. Josephus speaks of two columns, the one of stone, the other of brick, on which the children of Seth wrote their inventions and astronomical discoveries: Porphyry makes mention of some pillars, preserved in Crete, on which the ceremonies practised by the Corybantes in their sacrifices were recorded: Hesiod's works were originally written upon tables of lead, and deposited in the temple of the Muses, in Bœotia: the ten commandments, delivered to Moses, were written upon stone; and Solon's laws upon wooden planks. Tables of wood, box, and ivory, were common among the ancients: when of wood, they were frequently covered with wax, that people might write on them with more ease, or blot out what they had written. The leaves of the palm-tree were afterwards used instead of wooden planks, and the finest and thinnest part of the bark of such trees as the lime, the ash, the maple, and the elm; and hence comes the word *liber*, as applied to the inner bark of the trees. As these barks were rolled up, that they might be removed with greater ease, each roll was called *volumen*, a volume; a name afterwards given to similar rolls of paper or parchment.

BOOK'-BINDING, a very ingenious art, by which printed sheets are folded, gathered, pressed, sewed together, shielded with millboards, and covered with leather or cloth, which is lettered, and ornamented by the use of leaf gold and gilding tools.

BOOK'-KEEPING, the art of registering mercantile transactions for reference, statement, and balance; all of which must be so clearly done, that the true state of every part, and of the whole, may be easily and distinctly known.

BOOM (a tree: *Dut.*), a sea term, for a long pole extending along the bottoms of particular sails, as the *jib-boom*, and *studding-sail-boom.*——The *boom of a harbour* is a strong iron chain thrown across it, to prevent the entrance of an enemy; and a *fire-boom* is a strong pole thrown out from a ship to prevent the approach of fire-ships, &c.

BOO'MERANG, a wooden weapon used by the natives of Australia, in whose hands it performs marvellous feats, though in those of a European it is inert and intractable.

BOO'TES (*boōtes*, a herdsman; from *bous*, an ox: *Gr.*), a northern constellation containing Arcturus and 54 other stars. It is also known as Charles's Wain.

BORA'CIC ACID, in its native state, exists in several small lakes in Italy, and in certain hot springs, from whose waters it is deposited by natural evaporation. It is also obtained from the mineral called borax. The acid, when separated, appears in the form of a white, scaly, glittering substance, with hexahedral scales, soft and unctuous to the touch. Its taste is bitterish, with a slight degree of acidity. It is soluble in alcohol, which it causes to burn, when set on fire, with a green flame surrounded with a white one. Boracic acid was discovered by Sir Humphry Davy to be a compound of a peculiar base, which he called *boron*, and oxygen.

BO'RACITE (from *boron*), in Mineralogy, a native *borate of magnesia*; it is generally of a cubic form, and is remarkable for its electrical properties.

BO'RAX, *borate of soda*, a native salt found in certain waters, and discovered in them by its brackish and bitter taste; readily separable from them by evaporation, and appearing, on a careful solution and evaporation, in transparent crystals. It is chiefly obtained from Tuscany, where it issues from the earth combined with steam. It is also found in Thibet and China, and imported to this country under the name of tincal. Peru supplies a native borate of lime, from which it is also obtained. Borax makes no effervescence either with acids or alkalis; and, when heated, the water of crystallization being driven off, what is called *glass of borax* remains. Its use in soldering gold and other metals is well known. It is employed in metallurgy as a flux, and in remelting the small masses of gold and silver that are the produce of assays; by rubbing it over the vessels in which these are to be fused, it fills up all their small cavities, and leaves not the least roughness on the surface to retain any of the melted metal. It is used by dyers to give a gloss to silks; and it is also employed both as a cosmetic and as a medicine.

BOR'DURE (*border*, to edge: *Fr.*), in Heraldry, an edging on the shield, having a width of about one-fifth of the field; serving as a difference in a coat of arms, to distinguish families of the same name, or persons bearing the same coat.

BORE, a tidal phenomenon, occurring in some rivers that fall into estuaries. It is seen at spring tides as a violent rush of water up the stream, attended with much noise. The Severn, Trent, and Wye are subject to bores; but the most remarkable exhibition of the phenomenon occurs at the mouths of the Ganges and Brahmapootra.

BO'RING, in Mineralogy, a kind of circular cutting, or a method of piercing the earth with scooping irons, which, when drawn out, bring with them samples of the different strata through which they have passed By this means the veins of ore or coal may be discovered without opening a mine.——Boring for water has been very successfully practised of late. [See ARTESIAN WELLS.]

BO'RON, an elementary substance, the base of boracic acid. It is dark olive-coloured, and a non-conductor of electricity; is insoluble in water, and infusible. Heated to redness, it burns into boracic acid.

BOR'OUGH (*burg*, an enclosed place: *Sax.*). This word originally denoted a fortified city or town: but at present it is applied to a town or village which possesses certain municipal institutions, or the privilege of sending burgesses or representatives to parliament. By the regulations of the Municipal Reform Act, the corporation of a borough consists of the mayor, aldermen, and councillors, who form the council of the borough. The burgesses of the borough annually elect one-third of the whole number of councillors, and every third year there is an election of the aldermen to fill the place of those retiring, namely, one-half of the total number. The mayor is annually chosen by the aldermen and councillors, and he must be one of them.——BOROUGH ENGLISH is a customary inheritance of lands or tenements, in certain parts of England, by which they descend to the youngest instead of the eldest son, or, if the owner leaves no son, to the youngest brother. The custom goes with the land, and cannot be altered by any limitation of the parties.

BORSEL'LA, an instrument with which glass-makers contract or extend their glasses at pleasure.

BORS'HOLDER (borough holder, or borough's elder), among the Anglo-Saxons, one of the lowest magistrates, whose authority extended over only one tithing, or community of about ten families.

BOS (an ox: *Lat.*), in Zoology, a genus of ruminating quadrupeds (*Bovidæ*), including our common domesticated cattle.

BOS'SAGE (*bosse*, anything swollen out: *Fr.*), in Architecture, a term used for any stone that has a projecture, and is laid rough in a building, to be afterwards carved into mouldings, capitals, coats of arms, &c. ——BOSSAGE is also the name for what is otherwise called *rustic work*, which consists of stones that seem to project beyond the level of the building, by reason of indentures or channels left in the joinings. It is used chiefly in the corners of edifices, forming what are there called *rustic quoins*.

BOT'ANY (*botanê*, an herb: *Gr.*), that branch of natural history which treats of plants. It is divisible into: 1. Structural Botany, Organography, or Vegetable Anatomy, which has reference to the parts of which plants are composed. 2. Physiological Botany, which has reference to the processes carried on by living plants. 3. Systematical Botany, or Taxonomy, in which the relations of plants to one another are considered with a view to their arrangement and classification. Under the first the elementary organs or vegetable tissues are studied. All plants originate in, and in their simplest state wholly consist of, minute vesicles called cells, which are formed of an elastic membrane composed of cellulose. This is a compound of carbon, hydrogen, and oxygen. The tissues composed of it, for example the pith, are termed cellular or parenchymatous. Cells are usually round or oval, but they are sometimes prismatical, stellate, and other shapes. The other elementary tissue of plants is called Vascular, and consists of tubes much longer than wide. These are probably elaborated out of cells. Woody fibre or ligneous tissue is an instance of such tubes or elongated cells with thickened walls and pointed ends. All the vessels and channels through which fluids flow are composed of vascular tissue variously arranged. All the organs of plants are formed out of these two tissues. Of the form and structure of the root, stems, and leaves, we have no space to speak here, and must refer the reader to treatises on botany, and to the articles ROOT, AERIAL ROOTS, ENDOGENS, EXOGENS, LEAF. It may, however, be mentioned that botanists assign the term *phyllotaxis* to the arrangement of the leaves, with reference to the stem from which they spring; and the term *vernation*, is applied to the arrangement of the leaves in the bud. The corresponding terms *anthotaxis* or *inflorescence*, and *æstivation*, are given to the arrangement of the flowers with reference to the axis of the plant, and to the arrangement of the parts of the flower to each other before it opens. Referring now to the flower, or that part of the plant where the productive organs are situate, we may first notice the outer whorl or calyx, usually consisting of one or more green leaves. The *blossom* or *corolla* is that beautifully coloured part of a flower which principally attracts the attention. It is composed of one or more petals, or blossom leaves. When it consists of one, as in the polyanthus or auricula, it is termed monopetalous; but if it is composed of more than one, it is said to be polypetalous. Sometimes the calyx and corolla are so blended together that it is not easy to distinguish them, as in the lily and iris, and then the term *perianth* is applied to the whole. Sometimes neither calyx nor corolla is present, and the flower is then said to be naked or *achlamydeous*. If there is only one floral envelope, that is either calyx or corolla, the flower is termed *monochlamydeous*. The *stamens* are slender thread-like substances, placed within the blossom, and surrounding the pistil. They are composed of two parts—the *filament* or thread, and the *anther* or tip; but the latter is the essential part, as it contains the pollen, the fructifying principle which bursts forth in the form of a fine powder. This falling upon the stigma causes the ovary to produce fertile seed. A *pistil* consists of three parts, the germen or *ovarium*, the *style* or shaft, and the summit or *stigma*; but the second is often wanting. Some flowers have only one pistil; others have two, three, or more. The seed-vessel, in the newly opening flower, is called the *ovary*; but when it enlarges it is termed the seed-vessel. Some plants have no appendage of the kind, and then the seeds are uncovered, as in the dead nettle. The cup, however, usually encloses and retains the seeds till they ripen; and, in the tribe of grasses, this office is generally performed by what was previously called the blossom. *Nectaries* are those parts in a flower which usually contain a sweet nectarious liquor. They have generally the shape of spurs, but the name has been often extended to various unusual parts which have nothing to do with the secretion of honey. The receptacle is the seat or base to which the various divisions of a flower are affixed. Thus, if you pull off the calyx, the blossom, the stamens, the pistils, and the seeds or seed-vessels of a daisy, the body remaining on the top of the stalk is the receptacle.

Although the Linnæan system of arrangement has been abandoned for a natural classification, it is too intimately connected with the literature of botany to be altogether passed over, and we therefore give an outline of it. He divided all known plants into twenty-four *Classes*, distinguishing them according to the number or situation of the stamens, filaments, anthers, or male and female flowers in each plant, as follows:—

1. *Monandria*, plants having one stamen.
2. *Diandria* . . . . . . two stamens.
3. *Triandria* . . . . . . three stamens.
4. *Tetrandria* . . . . . . four stamens.
5. *Pentandria* . . . . . . five stamens.
6. *Hexandria* . . . . . . six stamens.
7. *Heptandria* . . . . . seven stamens.
8. *Octandria* . . . . . . eight stamens.
9. *Enneandria* . . . . . nine stamens.
10. *Decandria* . . . . . . ten stamens.
11. *Dodecandria*, from eleven to seventeen stamens.
12. *Icosandria*, many stamens inserted in the calyx.
13. *Polyandria*, twenty stamens and upwards, inserted in the receptacle.
14. *Didynamia*, four stamens in one flower, two longer than the rest.
15. *Tetradynamia*, six stamens, two shorter than the rest.
16. *Monodelphia*, the filaments connected in the form of a tube.
17. *Diadelphia*, the filaments forming two parcels.
18. *Polyadelphia*, the filaments forming several parcels.
19. *Syngenesia*, the anthers formed into a tube.
20. *Gynandria*, the stamens united with the pistil.
21. *Monœcia*, stamens and pistils in separate flowers, but in one plant.
22. *Diœcia*, stamens and pistils in separate plants.
23. *Polygamia*, stamens and pistils separate in some flowers, and united in others, either in the same plant, or in two or three different ones.
24. *Cryptogamia*, flowers inconspicuous, or invisible to the naked eye.

The *Orders*, or subdivisions of the classes, from class 1 to 13 inclusive, are marked by the number of styles or pistils in each plant; as *monogynia*, where there is but one pistil; and *digynia*, *trigynia*, *tetragynia*, &c., for two, three, four, or more pistils. In the 14th class, when the seeds are naked, the term *gymnospermia* denotes the order: when contained in a pericarp, *angiospermia*. In the 15th class, when the seeds are contained in a silique of different sizes, they are termed *siliquosæ*, if the pods are long; and *siliculosæ*, if they are short. The orders of the 16th, 17th, and 18th classes are marked by the number of stamens in each plant. The orders of the *Syngenesia* are determined by the arrangement of their flowers, and the sex of their florets. The orders of the 20th, 21st, and 22nd classes are distinguished by the number, &c. of the stamens. The two orders of the 23rd class depend on whether the genera are *monœcious* or *diœcious*. The last class, *Cryptogamia*, is divided into *Filices*, or ferns; *Musci*, or mosses; *Algæ*, or sea-weeds; and the different families of *Fungi*. Such an arrangement was evidently too artificial to continue in use after the study of anatomy and physiology had afforded data for a more philosophical classification. Many attempts have been made at such a classification, but no one has yet been proposed which has met with general acceptance. The following may be taken as one of the best. Plants are divided into three grand classes, of which the first contains the *Acotyledones*, or those which are destitute of seed-lobes. Such are the plants usually termed cryptogamic, and they may be separated into two sub-classes: 1. Those composed entirely of cellular tissue, such as lichens, fungi, and sea-weeds. 2. Those having a certain amount of vascular tissue along with cellular tissue, such as ferns and mosses.

The second class consists of *Monocotyledonous* (having one seed-lobe) or Endogenous plants, the latter term referring to the mode in which the wood grows, the exterior being the hardest part, and there being no true pith. There are three sub-classes. 1. *Glumaceæ*, the grass tribe. 2. *Petaloideæ*, plants with whorled floral envelopes, and leaves with parallel veins, including the orchid, iris, lily, palm, arum, and other orders. 3. *Dictyogenæ*, plants having whorled floral envelopes, and leaves with netted veins, including the yam, smilax, &c. The third class is composed of *Dicotyledonous* (having two seed-lobes) or Exogenous plants. These increase by additions at the outside, the hardest part being within. The sub-classes are: 1. *Monochlamydeæ*, plants with either no floral envelope, or one of a single whorl. Here are placed the *Gymnospermæ*, plants with naked ovules, which are fertilised by the direct application of pollen, without the intervention of a stigma, such as the Coniferous tribes, pines, cedars, larches, &c.; and the *Angiospermæ*, plants with seeds contained in an ovary, and fertilised by pollen acting on a stigma. Here are placed numerous orders, including the laurels, begonias, euphorbias, elms, and figs, as well as the catkin bearing plants, such as the willow, poplar, birch, plane, beech, chestnut, and oak. 2. *Corollifloræ*, plants having a calyx and a monopetalous corolla, which bears the stamens. A number of important orders fall into this sub-class, of which the salvia, verbena, primrose, convolvulus, and campanula, may be taken as examples. 3. *Calycifloræ*, plants having a calyx, and a polypetalous corolla, with stamens attached to the calyx. Here, also, are placed many orders, including those to which the pea and bean, the rose, myrtle, house leek, and carrot belong. 4. *Thalamifloræ*, plants having a calyx and a polypetalous corolla, with stamens which are inserted below the pistil. The water-lily, poppy, geranium, and all the cruciferous order may be cited as examples.

Several important orders of plants are noticed in various parts of this work, and the reader may consult the articles ACOTYLEDONS, ACROGENS, BULB, DICOTYLEDONS, MONOCOTYLEDONS, ENDOGENS, EXOGENS, ROOT, and AERIAL ROOTS.

BOTAR'GO, a kind of sausage, made of the roe of the mullet: it is much used on the Mediterranean coast as an incentive to drink.

BO'TRYOLITE (*botrus*, a bunch of grapes; and *lithos*, a stone: *Gr.*), in Mineralogy, a variety of siliceous borate of lime, which occurs in botryoidal concretions in a bed of magnetic iron in gneiss, near Arundel, and in Norway. Its colours are grey, reddish-white, and pale rose-red; and form concentric stripes.

BOTS, small worms found in the intestines of horses. They are the *larvæ* of a kind of gad-fly, the *Gasterophilus equi* of entomologists, a dipterous insect, which deposits its eggs on the tips of the hairs, generally of the fore-legs and mane, whence they are taken into the mouth and swallowed.

BOT'TOMRY (*botin*, the lowest place: *Sax.*), in Commerce, the act of borrowing money upon the keel or bottom of a ship; that is, the ship itself is pledged as security for the repayment of the money. If the ship is lost, the lender loses the money; but if the ship arrives safe, he is to receive the money lent, with the interest or premium stipulated, although it may exceed the legal rate of interest.

BOU'GIE (*Fr.*), a slender flexible tube intended for introduction into the urethra, œsophagus, or rectum, when those passages are obstructed by stricture or other disease.

BOU'LDERS, in Geology, large fragments of rock, either angular or rounded, lying detached on the surface of the earth, and evidently brought from a distance. They are believed to have been transported to their present sites by means of ice. They belong to a late geological period, and form part of what is termed the boulder formation.

BOUL'TINE, in Architecture, a convex moulding nearly the quarter of a circle: more usually called the egg or *quarter round*. It is placed next below the plinth in the Tuscan and Doric capital.

BOURGEOIS, a small kind of printing type, between long-primer and brevier. The type used in this work is four sizes smaller than *bourgeois*.

BOURSE (*Fr.*), on the continent of Europe, the name of an exchange, the building where merchants meet for the transaction of business.

BOUSTROPHE'DON (turning like ploughing oxen: *Gr.*), a term given to an ancient manner of writing, in which the lines are alternately to be read from right to left, and from left to right, as furrows are traced by the plough. The celebrated Sigean inscription and some other ancient Greek inscriptions in the British Museum have been cut in this manner.

BOUTS-RIME'S (*Fr.*), a term for certain rhymes disposed in order, and given to a poet, together with a subject, to be filled up with verses ending in the same words and in the same order.

BOW (past tense of *bygam*, to bend: *Sax.*), an instrument of war and hunting, formed of wood or other elastic material, which, after being bent by means of a string fastened to its two ends, throws out an arrow with great force and velocity. The bow is still used as a weapon of offence by many of the inhabitants of Asia, Africa, and America; and in Europe, before the invention of fire-arms, a part of the infantry was armed with bows, which were made of the yew-tree or ash, and were of the height of the archer. For several centuries the long-bow was the favourite national weapon in England, and many laws were made to encourage the use of it; the parliament under Henry VIII. complained of the disuse of long-bows, 'heretofore the safeguard and defence of this kingdom, and the dread and terror of its enemies.' The *cross-bow*, or arbalist, was a common weapon with the Italians, and was introduced into England in the thirteenth century; the arrows shot from it were called *quarrels*. Of the power of the Bow, and the distance to which it will carry, many remarkable anecdotes are related. Lord Bacon speaks of a Turkish bow which has been known to pierce a steel target, or a piece of brass; while other authorities declare they have seen an arrow shot from a bow a distance of 600 yards. [For further remarks, see ARCHERY.]——BOW, in Mechanics, is the name of several things so called from their curved figure; as, the *turner's bow*, a pole fixed to the ceiling and having attached to it the cord that whirls round the piece to be turned; the *bow of a saddle*, the piece of wood on each side, laid archwise to receive the upper part of a horse's back.——BOW is also the name of an instrument formerly used at sea for taking the sun's altitude; and consisting of a large arch of ninety degrees graduated, a shank or staff, a shade vane, a sight vane, and an horizon vane.——BOW, in Music, is the name of that well-known implement, consisting of a stick furnished with hair, by means of which the tone is produced from violins, &c.

BOWLS, a game played with wooden balls, which are rolled by the hand upon a fine smooth grassy surface, used solely for the purpose, and denominated a bowling-green.

BOX'-TREE. [See BUXUS.]

BRACE (*braccio: Ital.*; from *brachium*, the arm: *Lat.*), in Architecture, a piece of timber framed in with bevel joints, to keep the building from swerving either way. When the brace is fixed into the principal rafters, it is sometimes called a *strut* [see ROOF].——BRACES, in Marine language, are ropes belonging to all the yards of a ship, except the mizen, two to each yard, reeved through blocks that are fastened to pennants attached to the yard-arms.——*To brace about* is to turn the yards round for the contrary tack.——*To brace to* is to check or ease off the lee braces, and round in the weather ones, to assist in tacking.

BRA'CHIAL (*brachialis*, belonging to the arm; from *brachium*, the arm: *Lat.*), in a general sense, denotes something belonging to the arm; as, the *brachial artery*.——BRACHIALIS is particularly used for a thick and broad muscle of the arm, lying between the shoulder-bone and the elbow.

BRA'CHIATE (*brachiatus*, having boughs; from same: *Lat.*), an epithet for having branches nearly at right angles to the stem.

BRACHIOP'ODA (*brachion*, an arm; *poda*, feet: *Gr.*), a class of marine bivalve molluscs the shells being always equal sided, but never equivalve. One of the shells is perforated near the beak, to allow of the passage of the pedicle by which it is attached to some extraneous object. They have been termed lamp shells, from their resemblance to an antique lamp, the hole referred to being that through which the wick would pass in a lamp. The animals are destitute of any special breathing organ. Their scientific name was suggested by the two long arms furnished with cilia, with which they create currents that bring food to the mouth. 'Of all shell-fish,' says Mr. S. P Woodward, 'Brachiopoda enjoy the greatest range both of *climate* and *depth* and *time*. They are found in tropical and polar seas, in pools left by the ebbing tide, and at the greatest depths hitherto explored by the dredge. At present only 70 recent species are known, but above 1,000 extinct species are distributed through the sedimentary rocks of marine origin, from the Cambrian strata upwards. The oldest form of organic life at present known, both in the old and new world, is a Lingula.'

BRACHYCEPH'ALIC (*brachus*, short; *kephale*, the head: *Gr.*), a term applied by comparative anatomists to round skulls, such as those of the Calmucks; opposed to *dolicho-cephalic*.

BRACHYG'RAPHY (*brachus*, short; and *graphē*, a writing: *Gr.*), stenography, or the art of writing in shorthand.

BRACHYL'OGY (*brachulogia*: from *brachus*, short; and *logos*, a discourse: *Gr.*), in Rhetoric, the method of expressing anything in the most concise manner.

BRACHYPNŒ'A (*brachus*, short; and *pnoē*, breath: *Gr.*), in Medicine, short respiration at small intervals.

BRAC'TEA, or BRACT (*bractea*, a thin plate: *Lat.*), in Botany, an altered leaf, which grows on the flower stalk of many plants, below the calyx. It is the first attempt made by the common leaves to change into the floral organs, and may, in some cases, be mistaken for the calyx.

BRAC'TEOLATE (*bracteola*, a thin leaf: *Lat.*), in Botany, an epithet for plants which are furnished with bracteoles, or small bracts.

BRAH'MA. The religion of the Hindoos, that which is frequently styled Brahminism, inculcates a belief in a supreme deity under the name of Brahmă, who is an impersonal divine substance, the object merely of devout contemplation, not of worship. There is also Brahmā, the creator of the universe, and the first of the trimurti or triad of divinities; of whom Vishnu, the preserver, and Siva, the destroyer, are the others. In Sculpture, Brahmā is represented as having four faces. It is said that there are not any temples exclusively dedicated to him in India; but prayers are addressed to him, and he is worshipped along with the other members of the triad. Vishnu and Siva, however, have a great number of worshippers, and the sects who acknowledge each as their chief object of devotion are not to be counted. The greatest confusion exists as to the names and attributes of these deities. Great changes in belief have taken place in the progress of time, and the most learned Brahmin is unable to explain the great majority of the rites and articles of belief. Transmigration of souls is a leading tenet of Hindoo belief. The slaying of animals of the cow kind is forbidden, under the penalty of loss of caste. Brahminism must not be confounded with BUDDHISM, which see. See also the next article, and SIVA, VISHNU, PURANA, VEDAS.

BRAH'MINS (followers of *Brahma*), the highest caste amongst the Hindoos. Theirs is the exclusive duty of teaching the Vedas, and they were formerly considered bound to abstain from all laborious occupations, and to confine themselves to serving the gods and meditating on holy things. Though the members of this caste exact and receive respect from the other Hindoos, as their superiors, they are found following many occupations from which they are in strictness interdicted. The Gurus hold the first rank amongst them; they are the priests or spiritual advisers, having authority in matters of religion and education. [See CASTE.] To the Brahmins we are indebted for whatever we know of the Sanskrit, or ancient language of the country, in which their sacred books are written.

BRAIN (*brægen: Sax.*), in Anatomy, that soft white mass enclosed in the cranium or skull, in which all the organs of sense terminate, and the intelligent principle of man is supposed to reside. It consists of the *cerebrum*, which occupies the whole of the superior part of the cavity of the skull; the *cerebellum*, which occupies the lower back part; and the *medulla oblongata*, which is the smaller portion, lying at the base of the skull, beneath the cerebrum and cerebellum. The cerebrum is the largest portion of the brain in man, being nine times as heavy as the cerebellum. Above and behind it is divided into two 'hemispheres,' separated by a fold of the *dura mater*, but united below by the *corpus callosum*. The surface of the cerebrum is marked by a number of tortuous folds or convolutions. Its under surface is separated by transverse furrows, or *sulci*, into three lobes. The outer portion of the cerebrum consists of grey matter covering the internal white neurine. The cerebellum is protected from the pressure of the back part of the cerebrum by an extension of the dura mater, called *tentorium* cerebelli. It is divided into three lobes, of which the central one is small. The medulla oblongata gives rise to the spinal chord. The external portion of the brain is soft and vascular, and is called the *cortical* substance; the internal is called the *medullary*. Between the skull and the brain there are three membranes, called by the older anatomists *matres* (*mothers*), from the supposition that they gave rise to all the other membranes; the outer one is called the *dura mater*, which is strong, dense, and elastic; the next is the *pia mater*, which is very vascular; and the innermost is the *arachnoidea*, which is thin and nearly transparent. These membranes also invest the spinal chord. It is worthy of observation, that every part of the brain is exactly symmetrical with the part on the opposite side, and that irregularities in its structure are far more uncommon than in the other parts of the human body. It is stated that the brain of an average European child four years of age is twice as large as the brain of a full-grown gorilla. Notwithstanding the difference in size, Mr. Huxley says that, in cerebral structure, man differs less from the chimpanzee or the orang than these do from the monkeys, and that the difference between the brains of the chimpanzee and of man is almost insignificant, when compared with that between the chimpanzee brain and that of a lemur.

BRAIN STONE, the popular name of some stony corals growing in round masses and found in tropical seas, which bear some resemblance to the sinuous ridges of the brain. They are placed in the genus Meandrina and other allied genera.

BRAN, the skins or husks of grain, especially wheat, separated from the flour by a sieve or bolter.

BRAN'CHIÆ (*Lat.*, from *branchia: Gr.*), the gills or organs of respiration, answering to the lungs in other animals, with which all fishes are provided. There are usually four pairs on each side, and they consist of rows of threads, which absorb the oxygen from the atmospheric air contained in the water which passes over them. Fishes die when taken out of the water, not for lack of oxygen, but because the gills cling together and dry, so as to be incapable of performing their function.

BRANCHIOSTE'GAL RAYS (*branchia*, gills; *osteon*, a bone: *Gr.*), in Ichthyology, the slender bones upon which the membrane enclosing the branchial chamber is supported. There is a corresponding series on each side, the number varying in different fishes from three to ten times that number.

BRAN'DY (corrupted from *branntwein*, literally burnt wine: *Germ.*), a spirituous and inflammable fluid, chiefly alcohol, obtained from wine and other liquors by distillation. It is colourless, except when coloured artificially or by the cask. The wine-brandy, manufactured in France, is considered the best in Europe. It is made wherever wine is produced, and damaged wine is used for this purpose rather than what is good.

BRASS (*bræs: Ang. Sax.*), in Metallurgy, a factitious compound metal, of a yellow colour, consisting of copper, and from one-third to one-fifth its weight of zinc. It is more fusible than copper, and not so apt to tarnish; it is malleable when cold, but not when heated. It is so ductile, that fabrics for sieves, of extreme fineness, are woven with brass wire, in the same way as cambric.——CORINTHIAN BRASS has been famous in antiquity, and is a mixture of gold, silver, and copper. It is said that when L. Mummius sacked and burned Corinth, B.C. 146, this metal was formed from the gold, silver, and copper, with which that city abounded, and which, by the violence of the conflagration, were melted and run together.

BRAS'SICA (*Lat.*), in Botany, a genus of cruciferous plants, including the common cabbage and its numerous varieties, cauliflower, broccoli, &c. The cabbage was as much used by the ancients as it is by the moderns. The principal species are the *Brassica oleracea*, or common cabbage; and *Brassica Napus*, wild cabbage or rape.

BRAVU'RA (courage: *Ital.*), in Music, an air so composed as to enable the performer to show his skill in the execution of difficult passages. The term is sometimes used for the style of execution.

BRAZIL'-NUTS are the fruit of a large tree (*Bertholletia excelsa:* nat. ord. *Lethycidaceæ*) growing in tropical Brazil. On the tree they are contained in a woody case, as large and round as a cannon-ball. The nuts of the Sapucaya (*Lecythis ollaria*), a gigantic Brazilian tree belonging to the same order, are also edible. The hard capsules containing the nuts are called monkeys' drinking cups, and are furnished with a lid, which breaks off when the cups fall to the ground when the fruit is ripe. The nuts are thereby scattered over the ground, and are eaten by the wild animals of the forest. Hence this kind of nut is much scarcer than the other.

BRAZIL'-WOOD, the wood of the *Cæsalpinia Brasiliensis*, a lofty leguminous tree, found in the greatest abundance in the province of Pernambuco, in Brazil. The tree is large, crooked, and knotty: it is very hard, and susceptible of a fine polish; is pale when newly cut, but on exposure to the air is of a red colour. The juice of the Brazil-wood is made use of for dyeing silk of a crimson colour, but it is inferior to, and less permanent than, the crimson obtained from cochineal. It is also used, in combination with certain mordants and alkalis, for various shades of red, purple, and violet, in cotton and woollen cloths. The word *brazil* is of Portuguese origin (from *braza*, a live coal, or glowing fire), and the name was given to the wood from its colour. It is said that King Emanuel of Portugal called a part of America Brazil, on account of its producing this wood.

BRA'ZING, the soldering or uniting two pieces of metal together by means of thin plates of brass, melted between the parts that are to be joined. If the work be very fine, as when two leaves of a broken saw are to be brazed together, it is covered with pulverized borax, dissolved with water, that it may incorporate with the brass powder; or granulated hard solder, consisting of brass and zinc, and sometimes a little silver or tin, is applied to it. The piece is then exposed to the fire without touching the coals, and heated till the brass is seen to run.

BREACH (*brèche: Fr.*), in Fortification, a gap or opening made in any part of the works of a town by the cannon or mines of the besiegers, in order to facilitate an attack upon the place. The breach is called *practicable* if it is large enough to afford a reasonable hope of success in case of an assault.——*To repair a breach* is to stop or fill up the gap with gabions, fascines, &c., so as to prevent an assault.——In Law, a **Breach** is the violation of a contract.——**Breach of Pound** is the breaking any place where cattle are detained.——**Breach of Prison**, an escape by breaking out of prison.

BREAD (*brod: Germ.*), a preparation of flour and water, mixed with something, such as yeast, or a solution of carbonic acid, to make the mass spongy on being baked. It is the gluten which, by its viscidity, retains in the bread the gases which give it lightness by filling it with pores. Hence, only the flour of grains containing gluten will make spongy bread; and wheat flour, which contains it in so large a quantity, is usually mixed with every other kind in the making of bread. In the earliest antiquity, we find the flour or meal of grain used as food; and by degrees the artificial preparation of bread by proper fermentation was discovered: but it would appear that for many ages the meal derived from the bruised grain was merely mixed with milk and water, and the tough paste was made into balls. The superiority of wheat to all other farinaceous plants in the manufacture of bread is so very great, that, wherever it is successfully cultivated, wheaten bread is now used to the nearly total exclusion of others. But, in the 16th century, rye bread and oatmeal constituted the chief part of the diet of servants, even in great families; and in the reign of Charles I. barley bread was the usual food of the middle classes: nay, so lately as a century ago, not more than half the people of England fed on wheaten bread. The process of making bread is nearly the same throughout Europe, though the materials of which it is composed vary with the farinaceous productions of different climates and soils. The French, who particularly excel in the art of baking, have a great many different kinds of bread, from the *pain bis*, which is the coarsest of all, to the *pain mollet*, or soft bread, made of the purest flour, without any admixture. In this country we have fewer varieties of bread, and these differ chiefly in their degrees of purity. Our white or fine bread is made of the purest flour; our wheaten bread of flour, with a mixture of the finest bran; and our household bread, of the whole substance of the grain, without the separation either of the fine flour or coarse bran.——The *adulteration of bread*, by means of alum, has long been a prolific source of evil, inasmuch as the health of the public, and of children especially, is often seriously injured by it. It is, however, fortunate, that to discover this pernicious practice no chemical skill is required. For this purpose, a small piece of the crumb of new-baked bread is macerated in cold water sufficient to dissolve it, and if alum has been used by the baker, the water will acquire a sweetish astringency. When alum is present in bread, even in a minute quantity, it may be detected by treating the bread with distilled water, filtering the water first through calico, and next through filtering paper, till it becomes clear; then pouring it off into two vessels, and dropping into the one a little nitrate or chloride of barytes, and into the other some water of ammonia. In the former, if alum was present, a heavy white precipitate, indicating sulphuric acid, will appear, and in the latter a light precipitate of alumina, redissoluble by a few drops of solution of caustic potash. When chalk or plaster of Paris is used to sophisticate flour, they may be best detected by incinerating the bread, and adding to the ashes nitric acid, which will dissolve the chalk with effervescence, and the plaster of Paris without it. In both cases the calcareous matter may be rendered visible in the solution by oxalic acid, or better by oxalate of ammonia.

BREAD'-FRUIT-TREE, the *Artocarpus incisa* of botanists; nat. ord. *Artocarpaceæ*, to which order the JACK-TREE and the COW-TREE belong. It appears to have been first made known to Europeans by the great navigator Dampier. It is indigenous in Otaheite and other islands of the South Sea. The tree is of the size of a large apple-tree; the leaves broad, deeply lobed, and of a dark green. The fruit is appended to the boughs in the manner of apples, and is about the size of a pound of bread, enclosed with a tough rind, which, when ripe, turns a yellow colour. The internal part is yellow, soft and sweet. The natives bake it in an oven till the rind is black; and this being scraped off, they eat the inside, which is then white, resembling new-baked bread, having neither seed nor stone. Some of the trees have been planted in Jamaica and other West India islands, where the fruit is used as a delicacy; and whether employed as bread, or in the form of pudding, it is considered highly palatable. But in Otaheite the bread-fruit-tree not only supplies food, but clothing, and numerous other conveniences of life. The inner bark, consisting of a white fibrous substance, is formed into a kind of cloth; and the wood is used for the building of boats and houses.

BREAK'ERS, billows which break into foam over submerged rocks, or coral reefs, or upon the shore.

BREAKING GROUND, a Military term for opening the trenches and beginning the works for a siege.

BREAK'WATER a contrivance for weakening the effect of waves in a harbour. The largest breakwaters are those of Cherbourg and Plymouth.

BREAM, a name given to several fishes. The common bream is a well-known freshwater fish, of the Carp family, varying in colour from yellowish-white to yellowish-brown. The Spanish bream, the sea bream, and the black bream, are three closely allied marine fishes, belonging to the *Sparidæ*.——RAY'S BREAM, a rare fish on our coasts, is the *Brama Raii*, and belongs to the Dolphin family.

BREAST'PLATE, a piece of defensive armour worn on the breast; it was formerly deemed of great importance, but in modern warfare has fallen much into disuse. It forms a portion of the cuirass worn by the cuirassiers, and was first used, in modern times, in some of the First Napoleon's regiments.——In Horsemanship, a leathern strap running across the horse's breast, from one side of the saddle to the other, to keep it in its place.

BREAST'-PLOUGH, a sort of plough which is driven forward by the breast, and is used in paring off turf from the land.

BREAST'-WHEEL, a water-wheel, which receives the water at about half its height, or at the level of its axis.

BREAST'-WORK, a Military term for works thrown up to protect the besiegers against the fire of the besieged. It takes its name from its usual height.——A Sea term for the balustrade of the quarter-deck.

BREC'CIA, *Pudding Stone*, a natural conglomerate, consisting of fragments of stones united by some cement.

BREECH, or **BRITCH**, the hinder part of a gun, from the cascabel to the bore.——Also a Sea term for the angle of a knee-timber in a ship.

BREECH'ING, or **BRITCH'ING**, a rope used to secure the guns of ships of war, and prevent them from recoiling too much when discharged.

BREECH'-LOADERS, firearms which are charged not at the muzzle but at the other end of the barrel. Various contrivances have been adopted to render such a mode of charging easy and secure.

BREED'ING, in Husbandry, the rearing of cattle or live stock of different kinds, particularly by crossing or mingling one species or variety with another, so as to improve the species.

BREEZE (*brise: Fr.*), a shifting wind, that blows from sea or land for some certain hours in the day or night; common in Africa, and some parts of the East and West Indies. The sea-breeze is only sensible near the coasts; it commonly rises in the morning, about nine, proceeding slowly, in a fine small black curl on the water, towards the shore; it increases gradually till twelve, and dies away about five. Upon its ceasing, the land-breeze commences, which increases till twelve at night, and is succeeded in the morning by the sea-breeze again.——BREEZE (*braise: Fr.*), in Brick-making, small ashes and cinders, sometimes made use of instead of coals, for the burning of bricks.

BREVE (*brevis*, short: *Lat.*), in Music, a note equal in length to two semibreves, or, when dotted, to three: the *long* is twice the length of the breve, and the *large* twice the length of the long.

BRE'VET (*Fr.*), a Military term, expressive of nominal promotion without additional pay: thus, a brevet major does the duty of a captain, and draws pay as such. The word is borrowed from a French term signifying a royal act granting some favour or privilege; as *brevet d'invention*, a patent privilege.

BRE'VIARY (*breviarium*, a summary: *Lat.*), the book containing the daily service of the church of Rome. Originally everybody was obliged to read the breviary; but by degrees the obligation was confined to the clergy in holy orders or holding benefices, who are enjoined, under penalty of mortal sin and ecclesiastical censure, to recite it at home when they cannot attend to it in public. In the fourteenth century there was a particular reservation granted in favour of bishops, who were allowed, on extraordinary occasions, to pass three days without reciting the breviary. It was formerly much longer than at present: hence its name. The breviaries used in different places, and by different religious orders, are extremely different.——In Roman Antiquity, a book first introduced by Augustus, containing an account of the number of men in the army, the quantity of public money in the treasuries, &c., and other matters of importance.

BRE'VIATOR (an *abbreviator: Lat.*), an officer under the eastern empire, whose business it was to write and translate briefs.——One who draws up the Pope's briefs.

BREVI'ER (*brevis*, short: *Lat.*), in Printing, a small kind of type or letter, between *minion* and *bourgeois*.

BRI'BERY, the act of prevailing upon any individual to do a legal or illegal act for the sake of reward. A member of parliament proved to have been guilty of bribery loses his seat, and is fined 1000*l.* Any one attempting to obtain a seat in parliament by bribery, though unsuccessful, is subject to the same fine. The giving of a bribe directly or indirectly, for the purpose of obtaining an election to parliament, is a misdemeanour; and besides the punishment of this, the giver is to be fined 100*l.*, the receiver 10*l.* Meat, drink, or entertainment bestowed to corrupt a voter, is punishable with a forfeiture of 50*l.* by him who gives it, and incapacity of voting in him who receives it.

BRICK (*bricke: Dut.*), a composition of argillaceous earth, first moistened and made fine by treading and grinding, then formed into rectangular solids 8½ inches long, 2½ inches thick, and 4 inches wide, when burned. The dimensions of *fire* bricks are somewhat different; they are longer and thinner. The different varieties of bricks are—*malms*, which are yellowish, of a uniform colour and texture; *seconds*, which are somewhat inferior; red and grey *stocks; place bricks*, and *peckings*, which, being farthest from the fire, and not well burnt, have little durability; *burs* and *clinkers*, masses of brick run together by the heat; *fire-bricks, paving-bricks, compass-bricks* (made circular on the plan, and used for walling wells, &c.); *Dutch clinkers*, or *Flemish bricks*, which are of a very small size. Bricks are baked or burnt in a kiln, or in a *clamp*, to serve instead of stones in building. Place bricks and stocks are used in common walling; malms, which are of a fine yellow colour, hard, and well burnt, are used in the outside of buildings, and the best kind of them with red bricks, called cutting bricks, are used in the arches over windows and doors, being rubbed to a centre, and gauged to a height. An able workman will make, by hand, 5000 common bricks in a day, but machinery is now generally employed in the different operations of making bricks, tiles, and draining pipes. The use of unburnt bricks is of great antiquity; they are found in the Roman and Grecian monuments, and even in the ruins of Egypt and Babylon. They were dried in the sun, instead of being burned, and were mixed with chopped straw to give them tenacity. Owing to the extreme heat and dryness of the climate, they acquired such hardness as to last for several thousand years. The ancient Roman bricks were thinner, and of a different shape from ours; they were very durable, and vast quantities of them remain to the present day.

BRIDE (*bryd: Sax.*) Among the Greeks it was customary for the bride to be conducted from her father's house to her husband's in a chariot, the evening being chosen for that purpose to conceal her blushes: she was placed in the middle, her husband sitting on one side, and one of her most intimate friends on the other; torches were carried before her, and she was entertained on the journey with a song suitable to the occasion. As soon as they arrived, the axle-tree of the chariot they rode in was burned, to signify that the bride was never to return to her father's house. Among the Romans, when a bride was carried home to her husband's house, she was not to touch the threshold at her first entrance, but was to leap over it. In Germany the corresponding word *braut* is given to a woman between her betrothal and her marriage; and in that country she ceases to be a bride when she becomes one amongst ourselves.

BRI'DEGROOM (*bryd*, a bride; and *gyman*, to take care of: *Sax.*), a term used immediately before and after the marriage ceremony.

BRIDGE (*brieg: Sax.*), any structure carried across water or a roadway, and usually made of wood, stone, brick, or metal, but sometimes of basket-work or canes. Its strength depends on its form, its materials, and the permanence of the abutments. Among the bridges of antiquity, that built by Trajan over the Danube is considered to be the most magnificent; it was erected on twenty piers, of a hundred and fifty feet in height, and the opening from one pier to another was a hundred and seventy feet wide: the piers of this fine bridge are still to be seen on the Danube, between Servia and Moldavia, a little above Nicopolis. In Great Britain, the art of building bridges appears to have been diligently studied from early times. The most ancient bridge in England is the Gothic triangular bridge at Croyland in Lincolnshire, said to have been built in 860; but the ascent is so steep that none but foot passengers can go over it. The longest bridge in England is that over the Trent, at Burton in Staffordshire, built in the 12th century. It consists of thirty-four arches, and is 1545 feet in length. Among the great architectural works of our own times are Waterloo and New London bridges. The former consists of nine elliptical arches of 120 feet span each; it is 1250 feet long, and has a flat surface in its whole course. The latter, which was commenced in 1824, and finished in 1831, consists of five elliptical arches, the centre one being 152 feet span, and the least of them being larger than any stone arch of this description ever before erected. This magnificent structure, which was built after a design of the late John Rennie, contains about 120,000 tons of granite, measures 982 feet from the extremities of the abutments, with 53 feet of roadway between the parapets, and cost about two millions sterling. There are several cast-iron bridges in England, the chief of which is Southwark bridge, over the Thames. But all these structures have been much exceeded in vastness by the viaducts and bridges of railways.——SUSPENSION BRIDGES. Pendent or hanging bridges have by some been deemed a modern invention, but we find that the use of them is of great antiquity in mountainous countries; though the scientific principles which distinguish those of recent construction may perhaps be sought in vain among them. The most remarkable suspension bridge in existence is that built by Mr. Telford over the Menai strait, between the Isle of Anglesea and Caernarvonshire in Wales, which was finished in 1825. Others also, most elegant in their design, and fully answering all the purposes for which they were intended, have been erected over the Thames at Hammersmith and Battersea, and in many other places. In these the flooring or main body of the bridge is supported by strong iron chains or rods, hanging in the form of an inverted arch from one point of support to another. The points of support are the tops of strong pillars or small towers, erected for the purpose. Over these pillars the chain passes, and is attached, at each extremity of the bridge, to rocks or massive frames of iron, firmly secured underground. The great advantage of suspension bridges consists in their stability of equilibrium, in consequence of which a smaller amount of materials is necessary for their construction than for any other bridge. If a suspension bridge is shaken or thrown out of equilibrium, it returns by its weight to its proper form, whereas the reverse happens in bridges which are built above the level of their supporters.——A DRAWBRIDGE, in Fortification, is one that is fastened with hinges at one end only, so that the other may be drawn up; in which case the bridge stands upright, to prevent an enemy from passing the moat.——A BRIDGE OF COMMUNICATION is that made over a river, by which two armies, or forts, separated by that river, have a free communication with one another.——A BRIDGE OF BOATS consists of a number of common boats joined parallel to each other, at the distance of six feet, till they reach across a river. They are then covered with planks, so as to serve as a passage for men and horses. In military operations, temporary bridges are often formed by laying planks upon boats, pontoons, or such other buoyant supporters as readily present themselves. [See TUBULAR BRIDGE.]

BRIDOO'N (*bridon*, a *dim.* of *bride*, a bridle: *Fr.*), the snaffle and rein of a military bridle, which acts independently of the bit and curb, at the pleasure of the rider.

BRIEF (a letter: *Dut.*; from *brevis*, short: *Lat.*), in Law, an abridgment of the client's case, made out for the instruction of counsel on a trial or hearing.——A letter from the sovereign to the archbishops, bishops, &c., authorizing collections of money at the church-doors, for the repair of churches, &c. Its use has lately been discontinued. ——BRIEFS, APOSTOLICAL, letters or written messages of the pope, addressed to princes or magistrates, respecting matters of public concern.

BRIGA'DE (*Fr.*), a party or division of soldiers, either horse or foot. A brigade of infantry may consist of from one to six battalions; of cavalry, of two or three regiments; of artillery, of six pieces of ordnance; and of horse artillery, of twelve troops, each having a brigade of guns; and a brigade of sappers, of eight men. The commander of a brigade is called a brigadier-general.

BRIG'ANDINE (because worn by *brigands*), a kind of ancient defensive armour, consisting of thin jointed scales or plates so arranged as to be pliant and easy to the body.

BRIG'ANTINE (*brigantino: Ital.*), a small light vessel, which can both row and sail well, being adapted either for fighting or for chase.

BRIM'STONE, the vulgar name for sulphur, which see.

BRINE, a solution of common salt. It is either native, as sea water or the water flowing from salt springs; or artificial, as when formed by the solution of salt in water.

BRI'SE-VENT (*briser*, to break; and *vent*, the wind: *Fr.*), in Horticulture, shelters on the north side of melon beds, where walls

BRIS'TLE (*bristl: Sax.*), the hair of swine, which is much used by brushmakers, particularly that imported from Russia.

BRITAN'NIA, the name given by the Romans to the island of Britain, which is represented on their medals under the figure of a female resting her left arm on a shield. The name being of uncertain derivation has given rise to much discussion.

BRI'ZA (*brizo*, I nod: *Gr.*), in Botany, a genus of grasses, including our common Quaking-grass.

BRIZE, in Agriculture, a term for ground that has lain long untilled.

BROAD'SIDE, a Sea term for a discharge of all the guns on one side of a ship. In Printing, one full page printed on one side of a whole sheet of paper, of which a large posting-bill is an example.—A proclamation, or other old composition, printed on one side of a sheet, and formerly hawked about the streets for sale. They are objects both of curiosity and historical interest.

BROAD'SWORD, a sword with a broad blade, chiefly designed for cutting.

BROCA'DE (*Fr.*), a stuff of gold, silver, or silk, raised and enriched with flowers, foliages, and other ornaments, according to the fancy of the merchants or manufacturers.

BROGUE, a peculiar accent and style of pronunciation. The word is generally applied to that of the lower orders in Ireland.

BROKER (*broceur: Fr.*), in Commerce and Law, an agent who negociates between sellers and buyers, and is paid by a commission or brokerage. He is not, like a factor, entrusted with the possession of the goods, and he is not authorized to buy or sell in his own name. [See FACTOR.]

BROME GRASS (*brōma*, food: *Gr.*), a

sort of grass much resembling oats in the stalk, leaf, &c.; whence it has also been called oat-grass. It belongs to the genus *Bromus*.

BRO'MINE (*brōmos*, a bad odour: *Gr.*), in Chemistry, a liquid element of an intense red colour. It is very volatile, and boils at 145½° F. Its specific gravity is 2·9. Its vapour is very suffocating and has an offensive odour. Like chlorine, which it resembles in most of its properties, its solution in water has bleaching properties. It is obtained from the bittern of sea water or the washings of the ashes of seaweed.

BRON'CHI (*bronchos*, the throat: *Gr.*), in Anatomy, the ramifications of the trachea or windpipe, which convey the air to the lungs.—— *Bronchial Glands*, absorbent glands situated at the root of the lungs.—— *Bronchial Arteries* and *Veins*, those which accompany the bronchiæ into the lungs.

BRON'CHOCELE (*bronchos*, the throat; and *kēlē*, a tumour: *Gr.*), in Surgery, a tumour occurring in the anterior part of the neck. [See GOITRE.]

BRONCHOT'OMY (*bronchos*, the throat; and *temno*, I cut: *Gr.*), in Surgery, an incision made in the windpipe; which is necessary in many cases, and especially in a violent quinsy, to prevent suffocation from the great inflammation or tumidity of the parts. It is also sometimes called *laryngotomy* and *tracheotomy*.

BRONZE (*bronzo*: *Ital.*), an alloy which, when intended for statues, is composed of 91½ per cent. of copper, 5¼ per cent. of zinc, and about 1½ per cent. of tin and lead. The ancients used bronze for a great variety of purposes; hence, arms and other instruments, medals and statues of this metal, are to be found in all cabinets of antiquities. The moderns have also made much use of bronze, particularly for statues exposed to accidents or the influence of the atmosphere, and for casts of celebrated antiques. Bronze of a good quality acquires, by oxidation, a fine green tint, called *patina antiqua*, or *ærugo*, which appearance is imitated by an artificial process called *bronzing*.

BROOM, the *Spartium scoparium* of botanists, a well-known leguminous shrub, from which a yellow dye is obtained.—— The *Butcher's Broom* is a small shrub with prickly leaves, named by botanists *Ruscus aculeatus*, nat. ord. *Liliaceæ*.

BROWN'ISTS, in Church History, a religious sect, which sprang up in England towards the end of the 16th century, and was long known under the denomination of *Independents*. Their leader was Robert Brown, born at Northampton; yet his name was not adopted by them, but rather given to them by their adversaries as a nickname. They equally disliked episcopacy and presbyterianism. They condemned the solemn celebration of marriages in churches, maintaining that, matrimony being a civil contract, the confirmation of it ought to proceed from the magistrate; an opinion rather in accordance with recent enactments of our legislature on this subject. They also rejected all forms of prayer, and held that the Lord's prayer was not to be recited as such, being given only as a model upon which to found our supplications. Any lay brother was allowed the liberty of exhorting the congregation, and, after the sermon, of reasoning upon the doctrines that had been preached. In a word, every church on their model is a body corporate, amenable to no class, synod, convocation, or other jurisdiction whatever. During Elizabeth's reign, the laws were enforced against the Brownists with great severity, and accordingly many retired and settled at Amsterdam, where their church flourished nearly a century.

BRU'MAL (*brumalis*, from *bruma*, the winter solstice: *Lat.*), relating to the winter quarter of the year, which begins at the shortest day.

BRY'ONY, BLACK. [See YAM.]

BRY'ONY, WILD. [See CUCURBITACEÆ.]

BUB'BLE (*bobbel*: *Dut.*), a vesicle of water, &c., filled with air.——BUBBLE, in Commerce, a term given to any delusive scheme or project for raising money on imaginary or false pretences; as the famous 'South Sea bubble,' which see.

BU'BO, a genus of owls, to which our eagle owl belongs.——BUBO (*boubōn*, a gland in the groin: *Gr.*), in Medicine, the name of any tumour in the lymphatic glands of the groin or axilla.

BU'BONOCELE (*boubōn*, a gland in the groin; and *kēlē*, a tumour: *Gr.*), in Medicine, the inguinal hernia, a rupture of the groin, formed by a prolapsus of the intestines or omentum.

BUCANI'ER, or BUCCANE'ER, a name applied to those piratical adventurers, chiefly English and French, who, in the seventeenth century, committed the most terrible depredations on the Spaniards in America. The first French settlers in the island of San Domingo had been taught by the Caribbee Indians how to cure the flesh of the wild cattle and boars they killed, and the preserved meat was called *boucan* by the Indians. Whence the French formed a verb *boucaner*, to dry without salt, and from this came the words Boucanier and Buccaneer.

BUC'CINA (*Lat.*), an ancient musical and military instrument, somewhat similar to the modern trumpet.

BUCCINA'TOR (a trumpeter, from the last: *Lat.*), in Anatomy, a muscle of the cheek, so called from its office of forcing out the breath.

BUC'CINUM (same *deriv.*), a genus of molluscs, to which the common whelk belongs.

BUC'CULA (*Lat.*, from *bucca*, the cheek), in Antiquity, that part of the helmet which protected the cheeks.

BUCEN'TAUR (*boukentauros*, a centaur: *Gr.*), the name of the large vessel which the Venetians formerly used in the ceremony of espousing the sea. This took place annually on Ascension Day. The Doge threw a gold ring into the Adriatic, saying, 'Desponsamus te, mare, in signum veri perpetuique domini.' We wed thee, O sea, as a token of true and everlasting dominion.

BU'CEROS (*bous*, an ox; and *keras*, a horn: *Gr.*), a genus of birds belonging to the order of *Passeres*. They are the horn-bills of the tropical parts of Asia and Africa, remark able for having a large horny appendage of a cellular structure, growing on the upper division of the beak. Its use is not known.

BUCK (*bucc: Sax.*), the male of the fallow-deer. In his first year, a buck is called a **fawn**; in the second, a pricket; the third, a sorel; the fourth, a sore; the fifth, a buck of the first head; and the sixth, a great buck. The word is also used to denote the male of the hare and rabbit tribes.

BUCK'LER, a piece of defensive armour used by the ancients, commonly composed of hides, strengthened with plates of metal. —— BUCKLERS, VOTIVE, were those consecrated to the gods, and hung up in their temples, in commemoration of some hero, or as a thanksgiving for a victory obtained over an enemy, whose bucklers taken in war were offered as a trophy. —— BUCKLERS, in Naval language, are pieces of wood fitted together to stop the hawse-holes, so as to prevent the ship from taking in too much water in a heavy sea.

BUCK'RAM (*bougran: Fr.*), a sort of coarse cloth made of hemp, gummed, calendered, and dyed of several colours. It is used in drapery, garments, &c., which require to be kept stiff to their form.

BUCK'WHEAT, the seeds of the *Fagopyrum esculentum*, a plant belonging to the nat. ord. *Polygonaceæ*, cultivated as food.

BUCOL'IC (*boukolikos*, pastoral: *Gr.*), in ancient Poetry, a poem relating to shepherds and rural affairs. The most celebrated of the ancient bucolics are those of Virgil.

BUDD'HISM, or **BOOD'HISM**, an ancient system of religion which originated in India, where it is now extinct, and whence it was carried to Ceylon, Thibet, China, and Japan. Its adherents at the present day have been calculated to amount to several hundred millions. The priority of Buddhism and Brahminism, which have many points of identity, has been much disputed. The founder of this religion was, according to tradition, the son of an Indian king. He is known by several names, such as Sakyasinha, the lion of the race of Sakya, and Buddha or the sage. In China, the latter name has been corrupted into Fo-ta and Fo. After Sakyasinha's death, and to fill his place, a succession of perfectly virtuous souls have descended upon earth, and assumed human forms, for the welfare of mankind; and it is believed in Thibet that the Grand Lama of Thibet is his successor for the time being. [See LAMAISM.] The sacred writings of the Buddhists are very numerous; they were originally composed in Sanskrit, from which they were afterwards translated into other tongues. It would seem that there was a belief in a primeval Deity named Adi-Buddha, or the First Buddha, and that he was the first person of the trinity, the other two persons being Dhurma and Sunga, answering to Brahma, Siva, and Vishnu, of the Brahmins. The trident borne by the priests is emblematical of this trinity. The principal tenets of Buddhism are, that the world and all it contains are manifestations of the Deity, but of a transient and delusive character; that the human soul is an emanation of the Deity, and, after death, will be bound to matter, and subjected to the miseries of life, unless the individual to whom it belongs, by the attainment of wisdom through prayer and contemplation, secures its reabsorption into the Deity. The authority of the Vedas, the sacred books of the Brahmins, is rejected, as well as the sacrifices, ceremonies, and other religious observances of the Hindoos. There is no distinction of caste, and the priests, who are not forbidden the use of animal food, are obtained from all classes. Monasteries and nunneries abound wherever Buddhism flourishes. The ceremonies have so many resemblances to those of the Roman Catholic church as to strike European spectators with surprise. Amongst the characteristics of Buddhist temples are the dagobas and the images of Buddha. The former are stone structures of a hemispherical or pyramidal form, supported on cylindrical pedestals. The images represent a human form standing, reclining, or sitting, with curly hair, and ears drawn downwards. Besides many other monuments of the ancient worship of Buddha, there are two particularly remarkable—the ruins of the gigantic temple Boro-Budor in Java, and the five large subterranean halls, called Pantah-Pandu, on the way from Guzerat to Malwa. Tradition ascribes these astonishing works of ancient Indian architecture and sculpture, which far surpass the skill of the modern Hindoos, to the Pandus, the heroes of Indian mythology. Buddhism was expelled from India by the persecutions of the Brahmins between the fifth and seventh centuries of our era.

BUD'DING, a method of propagating plants. A bud with a small portion of bark is neatly cut off and transferred to another tree, a slit being first made in the bark of the latter to receive the bud. It is then bound round with thread until the bud has grown to and become part of the tree. The branch springing from the bud will afford flowers and fruit similar to those of the tree from which it was taken.

BUDE LIGHT (*Bude*, in Cornwall, where the inventor resided). This name was given by Mr. Gurney to a light in which oxygen gas was passed into the flame, instead of common air, which greatly increased the brilliancy of the light: but the expense prevented this arrangement from being used commonly. What is now called the *Bude* light is a gas flame, with two, three, or more concentric burners, chimneys supplied with common air, and reflectors of peculiar construction.

BUD'GET (*bougette*, a bag: *Fr.*), the name given to the annual statement of the public finances made to the House of Commons.

BUF'FALO (*boubalos: Gr.*), in **Zoology**, the popular name for some animals of the ox tribe, belonging to the genus *Bubalus*. The common buffalo, *B. buffelus*, has been domesticated in India, where they are also wild. They are very strong animals, and have horns sometimes measuring six feet in length. The Cape buffalo, *B. caffer*, lives in large herds in South Africa. It is a powerful beast, but has not been domesticated. Buffaloes have the most violent antipathy to a red colour, and are most furious and vindictive: they are fond of standing in the water, and swim the broadest rivers without hesitation. [See BISON.]

BUF'FERS (*bouffer*, to puff out: *Fr.*), elastic cushions attached to railway carriages for the purpose of breaking the shock when one carriage is pushed against another. They are usually formed of strong springs of steel, or of vulcanized caoutchouc.

BUFFET' (*Fr.*), anciently a little apartment separated from the rest of the room by slender wooden columns, for the disposing of china, glass, &c.

BUF'FO (*Ital.*), a singer, or actor, who takes the humorous part in comic operas, &c.

BU'FONITES (*bufo*, a toad: *Lat.*), in Mineralogy, a sort of stone formerly said to be found in the head of a toad, and hence vulgarly called *toadstone*.

BUG (*bugg*, terror: *Goth.*), a troublesome and disgusting insect; the *Cimex lectularius* of naturalists.

BU'GLOSS (*bouglōssos*: from *bous*, an ox; and *glōssa*, the tongue: *Gr.*), the *Ox-tongue*. In Botany, a name given to plants belonging to several distinct genera of plants, as *Anchusa*, *Lycopsis*, and *Asperugo*.

BUL, in the ancient Hebrew chronology, the eighth month of the ecclesiastical, and the second of the civil year; it has since been called Marshevan, and answers to our October.

BUL-BUL, an Indian name for the nightingale, whose loves with the rose are celebrated in eastern poetry.

BULB (*bulbus*: *Lat*; *bolbos*: *Gr.*), in Botany, is a subterranean leaf-bud covered with scales, from the centre of which proceeds a stem with leaves. At the base of the bulb is a sort of disc, from which the roots issue. Bulbs are said to be *solid* when composed of one uniform lump of matter, as in the tulip; *tunicated*, when formed of a great number of coats surrounding one another, as in the onion; *squamose*, or *scaly*, when composed of smaller flakes, as in the lily; *duplicate*, when there are only two to each plant; and *aggregate*, when there is a congeries of such roots to each plant.

BULI'MIA, or BU'LIMY (*boulimia*, hunger: *Gr.*), a disease in which the patient is affected with an insatiable and perpetual appetite for food.

BU'LIMUS (same *deriv.*), a very large genus of land molluscs allied to the common snails. About 700 species (including subgenera) have been described, and some of the African species are of very large size. The young have shells in the egg.

BULK'HEADS, partitions made athwart a ship, by which one part is divided from another; as in the great cabin, gun-room, bread-room, &c.

BULL (*bulle*: *Dut.*), in Astronomy, the constellation *Taurus*.——Also, an edict or mandate issued by the Pope, and sealed with the bulla, a leaden or gold seal.

BUL'LA (a bubble: *Lat.*), in Antiquity, a small round ornament of gold or silver, in the shape of a heart, worn about the neck or breast of the children of the nobility till the age of seventeen when they assumed the toga, and hung up the bulla as an offering to the *Lares* or household gods.——In Zoology, a large genus of gasteropod molluscs with ventricose shells which the animals more or less invest. The gizzard is furnished with three calcareous plates by which the food is triturated.

BUL'LATE (*bullatus*, from last), in Botany, an epithet for a leaf having protuberances on its surface resembling blisters.

BUL'LETIN, an official account of public transactions or matters of general interest.

BULL'-FIGHT, an entertainment frequent in Spain and Portugal, at which wild bulls are encountered by men armed with lances.

BULL'FINCH, a well known songster of the Finch family, the *Pyrrhula vulgaris* of ornithologists. The wild bird does much injury during the spring to gooseberry bushes, cherry trees and plum trees, by devouring their flower buds. Bullfinches which have been taught to warble particular tunes are imported in large numbers from Germany.

BULL'-FROG, the *Rana pipiens* of North America, the largest species of the genus, so called because its voice resembles the distant lowing of an ox.

BUL'LION (*bulla*, an ornament of metal: *Lat.*) uncoined and unwrought gold or silver, of any degree of fineness.

BULL'S'-EYE, a mark in the centre of a target, in the shape of a bull's eye, at which archers, &c., shoot by way of exercise.——In Astronomy, *Aldebaran*, a star of the first magnitude in the constellation Taurus.——Among seamen, a small obscure cloud ruddy in the middle, generally the immediate forerunner of a great storm.——In Architecture, any small circular opening or window.

BUL'WARK (*bol*, the trunk of a tree; and *werk*, a work: *Goth.*), in Fortification, a mound of earth capable of resisting cannon-shot. It is now termed a *bastion*.——The rails, &c., used to prevent persons from falling from the deck of a ship into the sea.

BUM'-BOAT, a sort of wherry used about harbours to carry provisions, &c., for sale to ships lying at a distance.

BUN'GALOW (*Ind.*), a house of one story with a thatched roof, such as is common in India.

BUNT (supposed to be a corruption of *bent*), in Nautical language, the middle part of a sail, formed into a sort of bag or hollow, that it may gather more wind.

BUN'TINE, or BUNT'ING, the thin woollen stuff of which the colours, or flags, and signals of ships are made.

BUN'TING (*buntinawg*, fat rump: *Wel.*), the appellation of several closely-allied birds, of which the Common Bunting, *Emberiza miliaria*, and the Yellow Bunting or Yellow-hammer, *E. citrinella*, may be taken as examples.

BUNT'LINES, small ropes fastened to cringles, which serve to force up the bunt of the sail for the better furling of it.

BUOY (*bouée*: *Fr.*), a short piece of wood or close-hooped barrel fastened by a rope to the anchor, to point out its situation.—— Also, conical vessels, generally of large dimensions and showily painted, that they may be seen at a distance, serving to mark out the course a ship is to follow in leaving a harbour, &c. Sometimes bells are attached to them, which ring by their motion, and denote their proximity in foggy weather.—— A LIFE-BUOY is intended to keep a person afloat till he can be taken from the water. It should be suspended from the stern of the ship, and let go as soon as anybody falls overboard, and a light may be attached to it which is kindled by its fall, if the accident happens by night. It usually consists of two hollow copper vessels connected together, and of buoyancy sufficient to support one man leaning upon them.

BU'PHAGA (*bous*, an ox; and *phago* I eat: *Gr.*), in Ornithology, a genus of South African birds allied to the Starlings. The species are termed Beef-eaters, or Cattle-pickers, from their settling upon the backs of oxen and other ruminants, to peck out with their beaks the maggots of bot flies deposited under the hide.

BUPRES'TIS (*bouprēstis: from bous*, an ox; and *pretho*, I swell out: *Gr.*), in Entomology, a genus of beetles belonging to a large family, the species of which are remarkable for the brilliant colours and metallic lustre of their wing cases. These are frequently employed in the decoration of ladies' dresses.

BUR'DEN, the contents of a ship, or the number of tons which a vessel will carry.—— BURDEN (*bourdon*, the drone of a musical instrument: *Fr.*), in Music, that part of a song which is repeated at every verse or stanza.

BUREAU' (an office: *Fr.*), in its primary sense, was a cloth covering a table; next a writing-table; and afterwards the chamber of an officer of government, and the body of subordinates who labour under his direction.

BUR'GAGE (*burgh*, a borough; from *beorg*: *Sax.*), an ancient tenure in boroughs by which the inhabitants hold their lands, &c. of the king, or other lord of the borough, at a certain yearly rent. There are also peculiarities as to descent. A dwelling-house in a borough was also formerly called a burgage.

BUR'GESS (*bourgeois: Fr.*), an inhabitant of a borough, or one who possesses a tenement within it. Also the representative of a borough in parliament. Also, the person who has the right to vote on the election of municipal officers.

BUR'GLARY (*burgi latrocinium*, robbery of a burgh: *Lat.*), in Law, the breaking and entering the dwelling of another in the night, with the intent to commit some felony. The like offence committed by day is called house-breaking.

BUR'GOMASTER, the chief magistrate of towns in Holland and Germany.

BU'RIN (*Fr.*), an instrument of tempered steel used for engraving on copper, &c. One end is ground off obliquely so as to produce a point, and the other is inserted in a short wooden handle.

BURLET'TA (*burlare*, to jest: *Ital.*), a light, comic species of musical drama.

BURN'ING. [See COMBUSTION.]

BURN'ING-GLASS, a convex lens which collects and concentrates to a focus the rays of heat that fall upon it from the sun; so that a piece of wood, or other body easily inflammable, is kindled when held in the focus.—— BURNING MIRRORS, or *specula*, are concave surfaces, which reflect the rays of heat to a focus. Among the ancients, the burning mirrors of Archimedes and Proclus are famous. By the former, the Roman navy was set on fire and consumed, at the distance of a bow-shot; and by the latter, according to Zonaras, the navy of Vitellius, while besieging Byzantium, was burnt to ashes. By means of a mirror made by Villette, a French artist of Lyons, a sixpence was melted in seven seconds and a half, and a halfpenny in sixteen seconds. This mirror was 47 inches wide, and ground to a spherical surface of 76 inches radius, so that its focus was about 38 inches from the vertex. Its substance was a composition of tin, copper, and bismuth.

BUR'REL-SHOT (*bourreller*, to torture: *Fr.*), small shot, nails, pieces of old iron, &c., put into cases, to be discharged out of ordnance.

BUR'SÆ MUCO'SÆ (mucous pouches, *Mod. Lat.*), in Anatomy, bags which secrete a mucous fat that serves to lubricate tendons, muscles, and bones, in order to render their motion easy.

BURR'-STONE, the hard tough stone of which the grinding stones of flour mills are made, cut out of some igneous rock. Millstones from the trachyte of the Eifel district on the Rhine are exported to many countries.

BUR'SAR (*bursa*, a purse: *Mod. Lat.*), in the English Universities, the treasurer of a college; in the Scotch Universities, a student whose success in his studies has gained for him a pension.

BUSH'-HARROW, an implement of husbandry for harrowing grass lands and covering grass or clover seeds. It consists of a frame with three or more bars, in which bushes are interwoven.

BUSH'MEN, or BOSJESMEN, a savage tribe living in South Africa, in the neighbourhood of the English settlements. They are more wild and ferocious than either the Caffres or Hottentots.

BUS'KIN, a kind of high shoe, anciently worn by tragedians; also a sort of leather stocking serving the purpose of a boot.

BUST, or BUS'TO (*Ital.*), in Sculpture, a figure or portrait showing only the head and shoulders, the arms being absent.

BUS'TARD, a name given to some birds belonging to the genus *Otis*, placed amongst the *Grallæ* or Waders. They are heavy birds, without much power of flight, and swift runners. The Great Bustard seems to have become extinct in England. The Little Bustard is occasionally a winter visitor.

BUTCH'ER-BIRDS, a species of LANIUS, which see.

BUT'TER (*bouturon: from bous*, a cow; and *turos*, cheese: *Gr.*), a fat unctuous substance, procured from the cream of milk by churning. This kind of oil, in its natural condition, is distributed through all the substance of the milk in very small particles, which are interposed between the caseous and serous parts, among which it is suspended by a slight adherence, but without being dissolved. Being in the same state as oil in emulsions, it causes the milk to be white; and separating by rest, it ascends to the surface, and forms a cream. It was only at a late period that the Greeks appear to have had any notion of butter; their poets make no mention of it, and yet they frequently speak of milk and cheese. The Romans used butter only as a medicine, never as a nutriment.——BUTTER, a name given in old books of chemistry to several metallic chlorides, on account of their appearance when newly prepared. Hence there are the butters of *antimony*, *arsenic*, &c.

BUT'TERCUP, the common name of some wild species of *Ranunculus*.

BUT'TERFLIES, a well-known tribe of lepidopterous insects, distinguished from moths by having the antennæ clubbed at the end, carrying the wings upright when in a state of repose, and being destitute of any apparatus to connect them during flight. [See LEPIDOPTERA.]

BUT'TER-TREE, a tree found by Mungo Park, in the interior of Africa, yielding from its kernels, by pressure, a white, firm, rich butter. The tree is supposed to have been some species of Bassia, nat. ord. *Sapotaceæ*, an order containing other trees with oily fruits.

BUT'TER-WORT, an English plant with purple flowers, growing in bogs, and belonging to the genus *Pinguicula*, nat. ord. *Lentibulariaceæ*.

BUT'TOCK (*aboutir*, to join end: *Fr.*) of a ship, is that part which is right astern, from the tack upwards; and a ship is said to have a broad or a narrow buttock, according as she is built broad or narrow at the transom

BUX'US (*Lat.*, from *puxos*: *Gr.*), a genus of evergreen shrubs belonging to the nat. ord. *Euphorbiaceæ*. One species, the common boxtree, is much used for the borders of flower-beds. Boxwood is extremely hard and smooth, and therefore capable of being wrought with great neatness by the turner. It is used for the same reason by engravers on wood.

BUZE, a wooden or leaden pipe to convey the air into mines.

BUZ'ZARD (*buse*: *Fr.*), a rapacious but sluggish bird of the Falcon tribe, the *Falco buteo* of naturalists.

BY'-LAWS, or BY'E-LAWS, private and peculiar laws for the good government of a city, court, or other community, made by the general consent of the members. All bye-laws are to be reasonable, and for the common benefit, not private advantage of any particular person; and they must be consistent with the public laws in force.

BYS'SOLITE (*bussos*, flax; and *lithos*, a stone: *Gr.*), a scarce mineral from the Alps, occurring in very delicate filaments, short, flexible, and elastic. The colour is olive-green, and the lustre rather silky.

BYS'SUS (*bussos*, flax: *Gr.*), a fine linen among the ancients, procured from India. Also that Egyptian linen, of which the tunics of Jewish priests were made.——BYSSUS, the fibrous matter by which some shell-bearing molluscs attach themselves to rocks and stones under water. The silky fibres of the byssus of the *Pinna*, a bivalve which grows to a large size, are made into gloves, and other articles of dress, in the island of Sardinia.

BYZAN'TINE, a gold coin of the value of 15*l.*, so called from being coined at Byzantium. Also an epithet for anything pertaining to Byzantium, an ancient city of Thrace, situated on the Bosphorus, nearly in the place where Constantinople now stands. Also a style of ARCHITECTURE.

C

C, the third letter, and second consonant of the alphabet, is pronounced like *k* before the vowels *a*, *o*, and *u*, and like *s* before *e*, *i*, and *y*. Before *h* it has a peculiar sound, as in chance, chalk; in chord and some other words, it is hard like *k*; but in many French words it is soft before *h*, like *s*, as in chaise, chagrin, &c. As a numeral, C stands for 100, and CC for 200, &c.; as an abbreviation, it stands for Christ, as A.C. or B.C., *Ante Christum*, or Before Christ. Also, in ancient authors, for Caius, Cæsar, consul, civitas, &c. For Civil, as D.C.L. *Doctor of Civil Law*; for Companion, as C.B. *Companion of the Bath*; for Cross, as G.C.B. *Grand Cross of the Bath*; for Commander, as K.C.B. *Knight Commander of the Bath*; for Company as E.I.C. *East India Company*. It was a symbol of condemnation in the Roman tribunals, as an abbreviation for *condemno*; being, on this account, called *litera tristis*, or a sorrowful letter, in opposition to *A*, for *absolvo*, a *litera salutaris*, or advantageous letter.——In Music, C after the clef is the mark of common time.

CAA'BA, or CAA'BAH (a square stone: *Arab.*), properly signifies the stone in the temple of Mecca, greatly reverenced by the Mahometans, as having been presented to the patriarch Abraham by the angel Gabriel. It is used also to indicate the edifice in which this stone is placed. The Mahometans always turn their faces towards this building when they pray, in whatever part of the world they happen to be. It enjoys the privilege of an asylum for all sorts of criminals; but is most remarkable for the pilgrimages made to it by the devout Mussulmans, who pay so great a veneration to it, that they believe a single sight of its sacred walls, without any particular act of devotion, is as meritorious, in the sight of God, as the most careful discharge of one's duty, for the space of a whole year, in any other temple.

CABAL', denotes a number of persons united in some close design, and is sometimes used synonymously with *faction*. This term was applied to the ministry of Charles II., from the initial letters of their respective names, viz., Clifford, Ashley, Buckingham, Arlington, and Lauderdale.

CAB'ALA, a mysterious kind of science pretended to have been delivered by revelation to the ancient Jews, and transmitted by oral tradition to those of our times; serving for the interpretation of the books both of nature and Scripture. It was of oriental origin, the work of Alexandrian Jews not long after the Christian era. It was alleged to have been divinely communicated to Esdras. It treated of the nature of the Deity, and of the various orders of spirits that had emanated from Him in long succession. For some centuries it fell into neglect, but was again studied in the middle ages. In the 15th century, the famous Picus of Mirandola was an enthusiastic disciple of it.

CAB'ALLINE (*caballus*, a horse: *Lat.*), pertaining to a horse; as, *caballine* aloes, so called from its being a medicine given to horses.

CAB'BAGE PALM. In the West Indies the *Areca oleracea* is known under this name, because its large terminal bud is eaten. Many other palms in different places also yield an eatable 'cabbage,' for instance, the *Euterpe edulis*, in Southern Brazil, a tall graceful tree, 40 or 50 feet high, with a stem so slender that it may be grasped by the two hands. The tree dies when the 'cabbage' is removed.

CAB'INET (*Fr.*), a place set apart for writing, studying, or preserving anything that is precious. Hence we say a cabinet of paintings, curiosities, &c.——Also, the closet or private room in the royal palace, where councils are held. Also, a certain number of the higher ministers of state who determine the measures and action of the government. These ministers are the First Lord of the Treasury, the Lord Chancellor, the President of the Council, the Lord Privy Seal, the Chancellor of the Exchequer, the five Secretaries of State for the Home, Foreign, Colonial, War, and Indian Departments, the First Lord of the Admiralty, the President of the Board of Trade, the Postmaster-General, the President of the Poor Law Board, and the Chancellor of the Duchy of Lancaster.

CABI'RI, deities greatly venerated by the ancient Pagans in Greece and Phœnicia, and supposed to preside over metals. Their nature and origin are involved in great obscurity.

CA'BLE, a large strong rope or chain, used to retain a vessel at anchor. An iron cable is not liable to be chafed on rocky ground, or to become rotten in moisture. A chain whose section is one inch breaks with sixteen tons pressure; and it is nearly equivalent to a hemp cable ten inches in diameter.

CABO'CHED, or CABO'SSE (*caboche: Old Fr.;* from *caput*, the head: *Lat.*), in Heraldry, having the head cut close, so as to have no neck left.

CABOO'SE, the cook-room or kitchen of a ship. It also signifies the box that covers the chimney of a ship.

CACA'DE (*kakos*, bad: *Gr.*), a French term for an unlucky enterprise in war, which has been ill concerted and ill conducted.

CACAO. [See COCOA.]

CACH'ALOT, the Physeter, or spermaceti whale.

CACHE'XIA (*Gr.*: from *kakos*, bad; and *hexis*, a habit), in Medicine, a bad state or habit of body.

CACH'OLONG (*Cach*, a river in Bulgaria; and *cholong*, a stone: *Calm.*), a milk-white chalcedony found on the borders of the river *Cach*.

CACOCHY'LIA (*kakos*, bad; and *chulos*, chyle: *Gr.*), in Medicine, a bad chylification, when the humour called chyle is not duly made.

CACO'CHYMY (*kakos*, bad; and *chumos*, juice: *Gr.*), a vicious state of the vital humours, especially of the blood, arising from a disorder of the secretions or excretions, or from contagion.

CACOE'THES (*Gr.: from kakos*, bad; and *ethos*, a characteristic disposition), an ill habit or propensity; as the *cacoethes scribendi*, an itch for authorship.

CACOPH'ONY (*kakos* bad; and *phōnē*, a sound: *Gr.*), in Rhetoric, an uncouth, bad tone of the voice, proceeding from the ill disposition of the organs; but more generally the term is applied to a harsh or disagreeable effect, produced by the too frequent repetition of the same letters, or the meeting of two or more monosyllables.

CACOT'ROPHY (*kakotrophia:* from *kakos*, bad; and *trophē*, food: *Gr.*), in Medicine, any sort of vicious nutrition.

CACTA'CEÆ, a nat. ord. of plants, all natives of America, and chiefly found in hot and dry places within the tropics. Many species are cultivated in our hothouses, and are well known for their bizarre shapes. Most of them are thickly set with spines. Several give beautiful flowers, the night-blowing Cereus for example; and some yield an edible fruit, called the Indian fig or prickly pear. Some are long, cylindrical, and undulating like a snake; others are spherical like a sea-urchin. Specimens of the latter shape have been known to measure between 6 and 7 feet in circumference. The cochineal insect feeds upon species of cacti, some of which have become naturalised in the south of Europe.

CAC'TUS (*kaktos*, a thorny plant: *Gr.*), the name of an American genus of plants, see the last article.

CADAS'TRAL (*cadrer*, to square: *Fr.*), a term applied to the measurement and mapping of a country on a uniform scale. The cadastral survey of Great Britain is to be on the scale of 25 inches to the mile. The ordnance survey of England and Wales, already executed, is on the scale of 1 inch to the mile.

CAD'DIS, or **CAD'DICE** (*kados*, a cask: *Gr.*), the worm-like larvæ of several species of four-winged flies, of the genus Phryganea (order *Trichoptera*), which haunt marshy places. The larvæ form cases, open at each end, of gravel, &c., in which they reside, immersed in water. Caddis worms are used as bait by anglers.

CA'DENCE (*cadenza: Ital.*), in Grammar, the fall of the voice; also the flow of verses or periods.—In Dancing, the term is used when the steps follow the notes and measures of the music.—In Horsemanship, the cadence is the measure or proportion observed by a horse in all his motions.—In Music, it is a pause or suspension at the end of an air, or at the termination of a proper chord.

CADET' (a younger brother: *Fr.*), one who is trained up for the army by a course of military discipline, such as that enforced at the military colleges of Woolwich, Addiscombe, &c.—CADETSHIP, the commission which was given to a cadet to enter the East India Company's service.

CA'DI, a civil judge or magistrate in the Turkish empire.

CAD'MIUM (*kadmia*, calamine, an ore of zinc: *Gr.*), a ductile and malleable white metal, which is like tin, but fuses and volatilizes at a lower temperature than that at which tin melts. Its specific gravity is 8·7. Its ores are associated with those of zinc. Cadmium is too scarce to be used generally in the arts, but it has been employed as a pigment.

CADU'CEUS (*Lat.*), the wand or sceptre of Mercury, being a rod entwined with two serpents, and tipped with wings; borne by that deity as the ensign of his office. Used on medals, &c., it is an emblem of peace; and it was carried by the Roman heralds when they went to proclaim peace. The rod signified power; the serpents, wisdom; and the wings, diligence and activity.

CADU'COUS (*caducus*, inclined to fall; from *cado*, I fall: *Lat.*), in Botany, denotes what is temporary and soon disappears or falls off.

CÆ'SAR, in Roman Antiquity, the family name of the first five Roman emperors, and afterwards adopted as a title by their successors. It was also used, by way of distinction, for the intended or presumptive heir of the empire. It was superseded in the eastern empire by the title of *Sebastocraton* (*sebastos*, venerable; and *kratos*, power; *Gr.*). The *Kaiser* of the Germans, and *Czar* of the Russians, are probably both corruptions of the word.

CÆSA'REAN OPERA'TION, the extraction of a child from the womb by an incision made for that purpose. Julius Cæsar is said to have been brought into the world in this way; and hence the term.

CÆSU'RA (*Lat.*, from *cædo*, I cut), a figure in Ancient Prosody by which a division or separation takes place in a foot that is composed of syllables belonging to different words. Also, in Modern Prosody, the pause which the voice makes in pronouncing a verse of many syllables. Thus, in the first line of the following couplet from Pope's 'Essay on Man,' the cæsura is between the fourth and fifth syllables whilst in the second line it is between the fifth and sixth:—

Lives thro' all life, extends thro' all extent,
Spreads undivided, operates unspent.

CÆ'TERIS PA'RIBUS (all things else being equal: *Lat.*), a term often used by mathematical and physical writers. Thus of a bullet it may be said '*cæteris paribus*, the heavier it is the shorter the range:'—that is, supposing the length and diameter of the piece and the quantity and strength of the powder to be the same.

CAFFERS, or **KAFIRS**, one of the savage races living in the southern part of Africa. The name is derived from the Arabic, and signifies infidel. The men are tall and well made, with clear dark-brown complexions and woolly hair. They are unsettled in their habits, and have frequently given much trouble to the English and Dutch colonists.

CA'GOTS (*Fr.*), a degraded race of uncertain origin, who were held accursed by their neighbours in the south of France. It is said they had a particular place set apart for them in the churches, with a separate entrance door.

CAINO'ZOIC (*kainos*, recent; *zoe*, life: *Gr.*), in Geology, a term applied to the tertiary series of strata, because the embedded organic remains are closely analogous to existing species.

CAIRNS, heaps of stones in a conical form, which are frequently to be met with in Scotland and Wales. They were intended as memorials or tombs, and differ from *barrows*, which were heaps of earth; but their object was probably the same.

CA'ISSON, or **CAISSOO'N** (*Fr.*), a wooden chest filled with bombs or powder, and laid in the way of an enemy, or buried under some work to blow it up. Also, the frame used in laying the foundations of a bridge. Also, a structure of wood or iron employed instead of gates to close the entry to a dock.

CA'JEPUT OIL, a stimulant oil distilled from the leaves of *Melaleuca cajeputi*, a tree belonging to the nat. ord. *Myrtaceæ*, growing at the Moluccas. It is a powerful sudorific, and is applied externally in chronic rheumatism.

CALABAR BEAN, the seed of a leguminous plant (*Physostigma venenosum*), growing on the west coast of Africa. It is a poison, and is used by the native chiefs as an ordeal to determine the guilt or innocence of suspected persons. It has been found that the extract of the bean possesses extraordinary power over the iris. A small quantity of the solution dropped into the eye causes contraction of the pupil to such an extent that the aperture becomes closed. Hence it is coming into use in the treatment of ophthalmic cases. Belladonna has the opposite effect, in causing such a dilatation of the pupil that the iris is scarcely visible.

CAL'ABASH-TREE (*calabacca*, a calabash: *Span.*), the *Crescentia cujete* of botanists, the gourd-like fruit of which is enclosed in a hard shell that serves the natives of the tropical parts of America for a drinking cup, a pot for boiling, and for various other domestic purposes.

CALAMAN'CO (*calamancus*, a hat: *Mod. Lat.*), a fine sort of woollen stuff, of a rich gloss, and chequered in the warp, so that the checks are seen only upon one side.

CALAMA'RY, or SQUID, common names for a section of cuttlefishes, having elongated bodies with short broad fins, and a horny internal pen or shell. The common calamary is the *Loligo vulgaris* of naturalists.

CALAMIF'EROUS (*kalamos*, a reed; and *phero*, I bear: *Gr.*), a Botanic term for plants having a long, hollow, knotted stem.

CAL'AMINE, or LAPIS CALAMINARIS, native carbonate of zinc: a name formerly given to the ore of zinc, used in making brass.

CAL'AMUS (*kalamos*, a reed: *Gr.*), a reed used anciently as a pen to write on parchment or papyrus.——The generic name of some Indian palms, including the dragon's blood calamus, and the rotang.——Also, a kind of reed, or sweet-scented cane, used by the Jews as a perfume.

CAL'ATHUS, in Antiquity, a basket or hamper, made of osiers or reeds, used to put needle-work in, or to hold flowers. The calathus was also a pan for cheese-curds and milk, and a cup for wine used in sacrifices.

CAL'CAR (*calcariæ*, a lime-kiln; from *calx*, lime: *Lat.*), a kind of furnace, used in glass works for the calcination of sand and potash.

CALCA'REOUS (*calcarius*, from *calx*, lime: *Lat.*), a term applied to anything composed of lime.

CALCA'REOUS SPAR (same *deriv.*), crystallized native carbonate of lime.

CAL'CEUS (*Lat.*, from *calx*, the heel), in Antiquity, a shoe or boot. The shoes were frequently open in front, leaving the toes bare. In the time of the Emperors, senators wore high shoes like buskins, fastened with four black thongs in front, and ornamented with a crescent.

CALCIF'EROUS (*calx*, lime: and *fero*, I bear: *Lat.*), having lime.

CALCINA'TION (*calx*, lime: *Lat.*), the process of the reduction of bodies to a pulverisable state by the action of fire, in the same way as lime is produced from limestone.

CAL'CIUM (*calx*, lime: *Lat.*), the metallic basis of lime. It is solid, rather yellowish, highly lustrous, but tarnishes quickly in the air. In contact with cold water it decomposes rapidly, and hydrogen is evolved. Heated to redness in the air, it burns and sends off sparks, but does not inflame. It is moderately hard, malleable and ductile, and has a specific gravity of 1·58. It is obtainable by the electrolysis of chloride of calcium.

CALCOG'RAPHY (*calx*, lime: *Lat.*; and *grapho*, I write: *Gr.*), an engraving after the manner of a drawing in chalk.

CALC-SINTER (*kalk*, lime; and *sintern*, to drop: *Germ.*), incrustations of carbonate of lime; also, the stalactites attached to the roofs of caverns.

CALC-TUFF, a deposit of carbonate of lime by water holding it in solution.

CAL'CULARY (*calculus*, a pebble: *Lat.*), a congeries of stony secretions found in the pulp of a pear and other fruits.

CAL'CULATING MACHINES. Mathematical calculations, both simple and complicated, enter so largely into the common concerns of life, that any machine capable of facilitating them must be considered of deep importance. The earliest contrivance of this kind was the *abacus*, which see. Within the last hundred years, several of great ingenuity have been devised, which were capable of performing simple operations. Their principle may be understood by supposing some number of wheels, each having a dial with ten numbered divisions and an index, and driving one another by pinions, so arranged that ten revolutions of one shall produce one revolution of that which it drives. Such a machine will represent the *decimal* system, and will indicate, without the possibility of error, the total number of impulses, each of which is expressed by one division of the first dial. This is the principle on which the gas meter registers the revolutions of its revolving part. It is the principle, also, of many contrivances for recording the number of strokes made by steam-engines in a given time, the number of persons passing over bridges at which toll is paid, &c. A very few wheels suffice to register enormous numbers. It is clear that such a train of wheels may be made to represent any system as well as the decimal. Pascal constructed a machine suited to the currency used in his time in Upper Normandy. These contrivances were not, however, calculated to supply a want most seriously felt — the production of arithmetical and other tables rigorously correct. From the imperfection of the human mind, and the impossibility of keeping the attention invariably fixed on any one object, errors must creep into such tables, and these errors must be highly inconvenient if connected with navigation, &c. The process of multiplication is not very complicated; yet, in an extensive table prepared by Dr. Hutton for the Board of Longitude, forty errors were detected in a single page, taken at random. These considerations led Mr. Babbage, nearly forty years ago, to make a machine which should construct tables of an important kind without the chance of error. It would be impossible to give any idea of his ingenuity and labours here. Government made grants at various times to meet the expenses of the mechanical processes required; but no recompense has been accepted by Mr. Babbage for his mental exertions. Considerable progress was made in what he called a 'difference engine,' but after about 17,000*l.* had been expended, and several years had been spent in the experiment, it was abandoned. The incomplete machine has been placed in the museum of King's College, London. Mr. Babbage has since invented a still more powerful machine, which he calls an 'analytical engine,' but it has never been constructed Meantime, a calculating machine has been a work for some years in the office of the Registrar-General, London. This was designed by Messrs. Scheutz of Stockholm, and has been found of great use. It not only calculates tables but prints them.

CALCULA'TION (*calculatio*, from *calculus*, a pebble: *Lat.*), the art of computing, deriving its name from the methods anciently used to facilitate calculations. [See ABACUS.]

CAL'CULUS (a pebble: *Lat.*), a name generally given to hard abnormal concretions, not bony, which are formed in the bodies of animals. *Biliary calculi* are those found in the gall bladder; *urinary calculi*, those found in the urinary bladder. The disease of calculus in the bladder is called *lithiasis*; in the kidneys, *nephritis*.——In Mathematics, the term *calculus*, taken in its widest sense, extends from the simplest numerical operations to the highest combinations of the transcendental analysis. Leaving out of view the simple processes of numerical computation the object of the calculus may be said to be the discovery of unknown quantities from known quantities.

CALEFA'CIENTS (*calefacio*, I make warm: *Lat.*), in Medicine such preparations as have a tendency to stimulate the action of the blood.

CAL'ENDAR (*calendæ*, the first of the month, from *calo*, I call: *Lat.*), a register of time, divided into months, weeks, and days throughout the year; together with an account of such matters as serve for the daily purposes of life. The Roman and Julian calendars were in use among the Romans; the Gregorian and reformed have been adopted by the moderns. [See STYLE.] The calendar received its name from its being the custom, in the early ages of Rome, for the pontiffs to call the people together on the first day of the month (the *calendæ*), to inform them what days in it were to be kept sacred.

CAL'ENDER (*caleo*, I am warm: *Lat.*), the process being literally a *hot-pressing*), a machine used in manufactories, to press stuffs, silks, linens, &c., to give them a fine gloss and wavy appearance. It consists of two thick rollers or cylinders, revolving so nearly in contact with each other that cloth passed through between them is not only smoothed, but glazed by their powerful pressure.

CALEN'DULA, a genus of plants of the nat. order *Compositæ*, including the common marigold.

CAL'ENTURE (*caleo*, I am warm: *Lat.*), a violent fever, incident to sailors in hot climates; the principal symptom of which is their desire to rush into the sea, which it is said, they imagine to be a green field.

CAL'IBER COM'PASSES, a particular instrument used by gunners for measuring the diameter of shot, shells, &c. They resemble other compasses, except in their legs, which are arched, so that the points may touch the extremities of the arch.

CAL'ICO, cloth made of cotton. It is called *calico*, because originally brought from *Calicut*, a kingdom of India on this side of the Ganges, on the coast of Malabar. Cotton cloths, whether plain, printed, dyed, stained, or painted, chintz, or muslins, are all included under this one general denomination.

CAL'ICO-PRINTING, the art of impressing cotton cloth with coloured patterns. It has been for many centuries practised by the oriental methods in Asia and the Levant, but it was unknown in this country till the end of the 17th century. The patterns are printed from revolving cylinders. Of late years great improvements have been made, especially in the chemical part of the art. Whilst silk and wool have a strong affinity for colours, cotton will not retain soluble colours without the aid of MORDANTS, which render the colours insoluble and thereby permanent. By varying the mordants, many changes of colour may be obtained from the same dye-stuff.

CAL'IGA (*Lat.*, from *calx*, the heel), in Antiquity, a heavy shoe worn by the Roman soldiers. *Caligæ* were sometimes adorned with gold and silver nails. The *caligula* was a smaller kind of military boot, from wearing which the emperor Caligula derived his name.

CA'LIN, a compound of lead and tin, of which the Chinese make tea-canisters, &c.

CA'LIPH (*khalifah*, a deputy: *Arab.*), the chief sacerdotal dignitary among the Saracens or Mahometans, vested with absolute authority in all matters relating both to religion and politics. It is at this day one of the Grand Seignior's titles, as successor of the Prophet [see SULTAN]; and of the Sophi of Persia, as successor of Ali. The government of the original caliphs continued from the death of Mahomet till the 655th year of the hegira, that is, from A.D. 632 to 1277.

CALK'ING, or CAULK'ING, the driving oakum, or old ropes untwisted, into the seams of a ship, to prevent their leaking or admitting water; after which they are covered with melted pitch or resin.——In Painting, the covering of the back side of a design with red chalk, and tracing lines through on a waxed plate or wall, so as to leave an impression of the colour there.

CALK'INS, in Farriery, the prominent parts at the extremities of a horse-shoe, bent downwards, and forged to a sort of point.

CALL OF THE HOUSE, a parliamentary term implying an imperative call or summons, sent to every member on some particular occasion.

CALLION'YMUS (*kalos*, beautiful; and *onoma*, a name: *Gr.*), a genus of spiny finned fishes, including the dragonet of our coasts.

CALLISTEI'A, in Grecian Antiquity, a Lesbian festival, at which the women presented themselves in the temple of Juno, in order that the prize might be assigned to the fairest. There was a similar festival of Ceres Eleusinia among the Parrhasians; and another among the Eleans, where the most beautiful man was presented with a complete suit of armour, which he consecrated to Minerva.

CALLO'SUM COR'PUS (the callous body: *Lat.*), in Anatomy, a medullary prominence in the brain, seen on separating the two lateral parts of the cerebrum. Its fibrous structure extends into the two hemispheres, and unites them organically together.

CAL'LUS (a hard thick skin: *Lat.*), the new growth of osseous matter between the extremities of fractured bones; or any dense, insensible knob or horny substance on the skin.

CA'LOMEL (*kalos*, beautiful; and *melas*, black: *Gr.*), a heavy white tasteless powder, the sub-chloride of mercury, prepared by heating a mixture of metallic mercury with corrosive sublimate (the protochloride of mercury). Calomel sublimes as a vapour. The name is an old one, and the reason of applying it to a white powder is not known.

CALOR'IC (*calor*, heat: *Lat.*), the old name of the principle of heat, as distinct from the sensation, when it was considered to be matter.

CALORIM'ETER (*calor*, heat: *Lat.*; and *metron*, a measure: *Gr.*), an instrument for measuring the heat given out by a body in cooling.

CALORIMO'TOR (*calor*, heat; and *motor*, a mover: *Lat.*), a galvanic instrument, in which the calorific effects are attended by scarcely any electrical power.

CALO'TE (*calotte*: *Fr.*), a sort of skull-cap worn by the French cavalry under their caps, as a guard against the blows of a sabre.

CAL'OTYPE (*kalos*, beautiful; and *tupos*, a sketch: *Gr.*), a process for obtaining photogenic drawings on paper by the action of light upon certain salts of silver. This process is also called *Talbotype*. [See PHOTOGRAPHY.]

CAL'TROPS. [See CROW'S FEET.]

CAL'UMET, a symbolical instrument of great importance among the Indians of America. It is a smoking pipe, the bowl of which is generally made of a soft red marble, and the tube of a very long reed, ornamented with feathers. This instrument, the use of which bears a great resemblance to the caduceus of the Greeks, is a pledge of peace and good faith. The calumet of war, differently made, is used to proclaim war.

CAL'VINISM, in Theology, the tenets of John Calvin, who, in the 16th century, flourished at Geneva, where his doctrines still subsist; they relate both to doctrine and discipline. The doctrinal parts of this system differ from that of other reformers of Calvin's period, chiefly in what regards the absolute decrees of God, by which, according to this teacher, the future and eternal condition of the human race was predetermined: in other words, Calvin denied the free agency of man, and maintained predestination. The discipline established by Calvin rejected episcopacy, and has been adopted by the Presbyterians of France, &c.

CALX (lime: *Lat.*), a name given by the alchemists to the remains of metals, minerals, &c., after they have undergone the action of fire, and have lost all their humid parts. On account of the combined oxygen, metallic calxes are heavier than the metal from which they are produced.

CALYCIFLORÆ (*calyx*, a flower cup; and *flos*, a flower: *Lat.*), a sub-class of dicotyledonous plants, having a calyx with the stamens attached to them, and a corolla of several distinct petals. Leguminous plants belong to this sub-class.

CALY'CIFORM (*calyx*, a flower cup; and *forma*, a shape: *Lat.*), in Botany, an epithet for the involucrum, when it has the appearance of a calyx.

CAL'YCLE (*kalukion*, a *dim.* of *kalux*, a flower-cup: *Gr.*), in Botany, a row of leaflets, at the base of the calyx on the outside.

CALYP'TRA (*kaluptra*, a covering: *Gr.*), in Botany, a thin membranaceous cap, or cowl, usually of a conic figure, which covers the parts of fructification in mosses.

CA'LYX (*kalux*: *Gr.*), in Botany, the flower-cup, or that whorl of the floral organs which is external to the corolla. It may consist of one or several leaflets. Its usual colour is green, but in the iris, lily, and some other flowers, its leaves are mixed with those of the corolla, from which they are not easily distinguished.

CAMARIL'LA (*Span.*), the private chamber of the sovereign of Spain; but the term is generally applied to his immediate confidants, and is synonymous with *clique*.

CAM'BER-BEAM (*cambrer*, to bend: *Fr.*), in Architecture, a beam cut hollow or archwise in the middle, commonly used in platforms.

CAM'BERED (same *deriv.*), an epithet applied to the deck of a ship, the flooring of which is highest in the middle; also when it is defectively so, or what is sometimes called *broken-backed*.

CAM'BRIAN SYSTEM, in Geology, a series of sedimentary rocks lying below the Silurian beds, and being the lowest fossiliferous rocks yet discovered. They are divisible into two groups, upper and lower. The latter is seen in North Wales, and in Wicklow, Ireland, where a few zoophytes have been found in them. The former group is to be seen in North Wales and Shropshire, and has yielded some shells, trilobites, crustaceans, and polyzoa. This system has a thickness of many thousand feet. It has received its name from the place of its chief development.

CAM'BRIC, a species of fine white linen, made of flax, said to be named from Cambray, in Flanders, where it was first manufactured.

CAM'EL (*kamelos*: *Gr.*), a genus of hornless ruminant quadrupeds, containing two species, which are only known in the domesticated state. The dromedary, or African camel (*C. dromedarius*), has one hunch on the back; the common, or Asiatic camel (*C. Bactrianus*), has two humps. They are distinguished from other bovine animals by the possession of cutting teeth in the upper jaw. The camel, by its power of sustaining abstinence from drink for many days, from the peculiar formation of its stomach, and of subsisting on a few coarse shrubs, is peculiarly fitted for the parched and barren lands of Asia and Africa. The Arabians live chiefly on the milk of their camels; and without them they could neither carry on trade, nor travel over their sandy deserts.

CAMEL'LIA, in Botany, a genus of plants, well known in conservatories for their beautiful flowers. They are natives of China and Japan. The tea-plant belongs to the same nat. ord.: *Ternströmiaceæ.*

CA'MELOPARD (*kamēlos*, a camel; and *pardalis*, a leopard: *Gr.*), or GIRAFFE. This animal, whose existence was at one time disputed, is a native of several parts of Africa, living in forests, and feeding on the leaves. It has two straight horns, without branches, six inches long, covered with hair,' truncated at the end, and tufted. The shoulders are of such a length as to render the fore part of the animal much higher than the hind part. The neck is very long, the head slender and elegant, and the colour of the body is a dusky white, with large rusty spots. It is mild and inoffensive, and in cases of danger has recourse to flight for safety, but when obliged to stand on self-defence, it kicks its adversary. It derives its name from a supposed resemblance to both the camel and the leopard. It is a ruminant animal of the ox family, and has been named *Giraffa camelopardalis* by naturalists.

CAMELOPAR'DALIS (the camelopard: *Gr.*), in Astronomy, a constellation consisting of 58 stars, situated between Cepheus, Perseus, Cassiopeia, Ursa Major and Minor, and Draco.

CAM'EO, or CAMA'IEU, a peculiar sort of onyx; or a stone or shell on which figures are cut in relief on a differently coloured ground.——The name is likewise given to such paintings as have but one colour, where the lights and shades are made on a ground of gold or azure.

CAMERALIS'TICS (*kameralien*: *Germ.*; from *kamera*, a chamber: *Gr.*; strictly, a place with a vaulted roof), the science of finance or public revenue, comprehending the means of raising and disposing of it.

CAM'ERA LU'CIDA (a bright chamber: *Lat.*), an optical instrument, for throwing upon paper the image of an object, so that it can be drawn.

CAM'ERA OBSCU'RA (a dark chamber: *Lat.*), an optical instrument. The light being collected and thrown through a single aperture, external objects are exhibited distinctly, and in their natural colours, on any white surface placed within it.

CAMISA'DE (*camisa*, shirt: *Languedocian*), a French term for attacking or surprising an enemy by night. It obtained the name from the *Camisards*, or French Protestants, in the Cevennes, who, after the revocation of the Edict of Nantes, suffered much persecution from the government in the early part of the last century. Going about at night, they were accustomed to wear a shirt over their other clothes, that they might recognize each other. They called themselves 'Enfants de Dieu.' Gibbon has alluded to 'the boldness, the crimes, and the enthusiasm of the fanatics of Languedoc.'

CAM'LET (*camelus*, a camel: *Lat.*), a sort of stuff originally made of camel's hair and silk mixed, but now of wool and silk.

CAMP (*campus*, a field: *Lat.*), the residence of an army resting in tents; or the place and order of tents for soldiers in the field. On the continent of Europe the armies *bivouac* in the open air, or, if the time will allow it, lodge in huts built of branches, &c. In the progress of the military art, camps have become slight and simple. The Romans carried the art of encamping to great perfection. Their camp was quadrangular: it was surrounded by regular entrenchments, and so arranged that each cohort, legion, and individual, knew exactly the point he should occupy, and the place to which he should proceed in case of alarm.

CAMPA'IGN (*campagne*, the country: *Fr.*), the space of time during which an army is kept in the field. A campaign is usually from spring to autumn; but sometimes armies make a winter campaign.

CAMP'ANILE (*Ital.*), a bell tower, frequently standing apart from the building to which it belongs.

CAMPAN'ULACEÆ, a natural order of herbs or undershrubs, with monopetalous bell-shaped flowers (whence the name, *campanula*, a little bell: *Lat.*). They are natives of temperate regions. Our common hare-bell and the flower called Canterbury-bells, are examples. The order yields little that is of value to man.

CAMPAN'ULATE (same *deriv.*), or CAMPAN'IFORM (*campana*, a bell; and *forma*, a form: *Lat.*), in Botany, an epithet for the corolla, or calyx, when either is bell-shaped.

CAM'PHENE (*camphor*, an artificial kind of which is made from oil of turpentine), a hydro-carbon, consisting of highly rectified spirit of turpentine.

CAM'PHOR (*caphura*: *Arab.*), a white concrete crystalline substance, of an acrid bitter taste, and a penetrating smell. It is extracted from the *Camphora officinarum*, nat. ord. *Lauraceæ*, a large tree growing wild in China, Borneo, Sumatra, &c. To obtain camphor, the tree is cut down, and divided into pieces, and the camphor is taken out; being found in small whitish flakes in and near the centre. It is also obtained by distilling the wood with water. Like most of the essential oils it is a hydrocarbon, combined with oxygen. It slowly sublimes and wholly disappears at the ordinary temperature of the atmosphere. It is soluble in alcohol, ether, and strong acetic acid, but very sparingly in water.

CAM'PION, in Botany, the *Agrostemma* of Linnæus. The rose campion, or *Agrostemma coronaria*, is a well-known garden flower.

CAM'PUS MA'II (the field of May: *Lat.*), an anniversary assembly of our ancestors, held on May-day, when they confederated together for defence of the kingdom against all its enemies.

CAM'PUS MAR'TIUS (the field of Mars: *Lat.*), among the Romans, a field, by the side of the Tiber, where the youth exercised themselves in warlike exercises. It was so called on account of a temple that stood on it, consecrated to the god Mars. The consuls Brutus and Collatinus are said to have made it the place for holding the comitia or assemblies of the people: and, in after times, it was adorned with a great number of fine statues. It constitutes the principal part of the modern city of Rome.

CAM'WOOD, a material from which a brilliant red colour is obtained by dyers. It is the produce of a leguminous tree growing in India, the *Baphia nitida* of botanists.

CAN'ADA BAL'SAM, a very pure turpentine; a natural combination of resin with the essential oil, chiefly extracted from the Balm of Gilead Fir (*Abies balsamea*) growing in Canada. It is employed in medicine, and as a medium for mounting microscopic objects on glass slides.

CANAL' (*canalis : Lat.*), an artificial river, provided, if required by the nature of the place through which it passes, with locks and sluices, and sustained by banks and mounds.——In Anatomy, a duct or passage in the body of an animal, through which any of the juices flow, or other substances pass.

CANA'RIUM AUGU'RIUM (*canarius*, belonging to a dog; and *augurium*, an augury : *Lat.*), in Antiquity, a sacrifice among the Romans of a red dog, for the purpose of appeasing the fury of the dog-star on the approach of harvest.

CANA'RY BIRD, a beautiful yellow singing bird much bred in England, brought originally from the Canary Islands, where it is of a green colour. It is a species of finch, and was introduced into Europe in the sixteenth century.

CANCELLA'RIA CU'RIA (*Lat.*), in Archæology, the Court of Chancery.

CANCEL'LI (*Lat.*), in Architecture, trellis or lattice work, made of cross bars of wood or iron. Also the balusters or rails encompassing the bar of a court of justice.

CAN'CER (a crab : *Lat.*), in Medicine, a hard ulcerous and exceedingly painful swelling, generally seated in the glandulous parts of the body. Its extirpation affords the only chance of recovery. It obtained its name from the large blue veins which ramify round a cancer of the breast, compared by old authors to the claws of a crab.——In Zoology, a genus of crabs, to which the large edible crab of our coast belongs.——In Astronomy, a constellation, and the fourth sign in the zodiac, which the sun enters on the 21st of June, thence called the summer solstice.——TROPIC OF CANCER, a small circle of the sphere, parallel to the equator, and passing through the beginning of Cancer.

CANDELA'BRUM (*Lat.*), originally signified a candlestick amongst the ancients, afterwards a support for a lamp. They were made of wood, metal, or marble, and were carved into a variety of elegant shapes. A shaft, standing on three short legs, was a common form.

CAN'DIDATE (*candidatus*, clothed in white; from *candidus*, white : *Lat.*), a person who seeks or aspires to some public office. In the Roman commonwealth, the *candidati* were obliged to put on a white robe while soliciting a place. According to Plutarch, they wore this garment without any other clothes, that they might not be suspected of concealing money for purchasing votes, and also that they might the more easily show the scars of those wounds they had received in fighting for the defence of the commonwealth.

CANDIDA'TI MIL'ITES (soldiers clothed in white : *Lat.*), an order of soldiers, among the Romans, who served as the emperor's body-guards to defend him in battle. They were the tallest and strongest of all the troops, and were called *candidati* in consequence of being clothed in white.

CAN'DLE (*candela : Lat.*). Candles, formerly made only of tallow and wax, are now made of other substances, such as *palm oil*, *paraffine* and *stearic acid* (or stearine), either pure or mixed with *margaric acid*. The candle manufacture is a very extensive one in this country, notwithstanding the enormous consumption of gas and oils. Tallow, spermaceti, stearic acid, and paraffine candles are cast in moulds, but wax candles are made by pouring melted wax over each wick as it hangs over a pan of wax, until the requisite thickness has been obtained. It is then rolled on a table until it acquires a cylindrical shape.

CAN'DLE-BERRY-TREE, the *Myrica cerifera*, or wax-bearing myrtle, nat. ord. *Myricaceæ*, a shrub common in North America, from the berries of which a kind of wax is produced of which candles are made.

CAN'DLEMAS-DAY (*candle-mass*, from the candles consecrated at the mass of that day), the festival observed on the 2nd of February, in commemoration of the purification of the Virgin Mary. In the Roman Catholic church the candles then blessed at the mass are used in processions and other ceremonies throughout the year.

CAN'DY (*candidus*, white : *Lat.*), a preparation of sugar made by melting and crystallizing it several times.

CAN'DYTUFT (same *deriv.*), a common garden annual, belonging to the genus *Iberis* : nat. ord. *Cruciferæ*.

CANE'PHORÆ (*kanēphoroi* : from *kanē*, a basket; and *phero*, I bear : *Gr.*), the noble Athenian virgins who carried the baskets at public festivals.—— In Architecture, figures of young women bearing baskets on their heads, and often confounded with *Caryatides*.

CAN'FARA, a sort of ordeal by fire, as it once existed in this kingdom. The accused carried hot irons in his hands, and if he came off unhurt, he was deemed innocent.

CANIC'ULAR DAYS (*canicularis*, pertaining to the dog-star; from *canicula*, the dog-star : *Lat.*), a period of the year commonly called the *dog days*. It lasts about forty days, beginning the 3rd of July, and ending the 11th of August. *Sirius*, or the dog-star, rose in ancient times heliacally, that is, just before the sun, at the beginning of July; and the sultry heat, which had a tendency to render dogs mad, was ascribed to the malignant influence of that star. The precession of the equinoxes has caused the heliacal rising of the dog-star to take place later, and in a cooler season; so that the dog-star has not now the same reference to hot weather. The Ethiopians and Egyptians began their year at the rising of the dog-star, reckoning to its rise again the next year: and hence it is called the *canicular year*.

CA'NIS (*Lat.*), a genus of quadrupeds, class *Mammalia*, order *Feræ*. It comprehends animals that differ very essentially from each other in their habits, as the dog, the wolf, the fox, and the jackal. ——CANIS, in Astronomy, the name of two constellations in the southern hemisphere; namely, Canis Major and Canis Minor.

CAN'KER (*cancer*, a crab: *Lat.*), a corroding disease which occurs frequently in fruit trees.——Also a fungous excrescence in the feet of horses.

CAN'NEL-COAL, or CANDLE-COAL, a hard, opaque, inflammable jet-black fossil coal, which burns with a bright white flame, like a candle. It is sufficiently solid to be cut and polished, and, like jet, is often made into trinkets. In Scotland it is called parrot coal.

CAN'NEQUIN, white cotton cloth brought from the East Indies, made in pieces of about eight ells long.

CAN'NON (*canna*, a pipe made of reed: *Lat.*), a piece of ordnance, or a heavy metallic gun for a battery, mounted on a carriage. Cannon are made of iron, steel or brass, and are of different sizes, carrying balls varying from three pounds weight to several hundred. The explosive force being directed by the tube, balls and missiles are carried to great distances with destructive power. In a field of battle they are often drawn by horses on light carriages, and are then called field pieces, or flying artillery. The different parts of a cannon are, the *breech*, or solid metal, from the bottom of the bore to the *cascabel* or extremity of the solid end; the *trunnions*, which project at each side, and form an axis, on which it turns; the *bore*, or cylindrical cavity, which at present is not cast, but formed in the solid metal by a boring machine; and the *chamber*, which is a recess for the powder, formed at the end of the bore, and of smaller diameter. Cannon were originally made of longitudinal bars, bound with strong hoops; and this mode of manufacture has been, in some instances, revived.

CANO'E, a small boat, formed of the trunk of a tree, hollowed out by cutting or burning; and sometimes also of pieces of bark joined together. It is impelled by a paddle instead of an oar, and is used by uncivilized nations in both hemispheres.

CAN'ON (*kanōn*, a rule: *Gr.*), is a word of many meanings. Thus it signifies the laws and ordinances of ecclesiastical councils. ——The authorized and received catalogue of the books of Scripture.——A dignitary in cathedral and collegiate churches who, when he performs the duties of his office, is termed *residentiary*.——Originally, canons were priests who lived in community, residing near the cathedral church, and assisting the bishop; but, by degrees, shaking off their dependence, they formed separate bodies: in time they freed themselves from their rules, and at length ceased to live in a community.——In modern Music, a *canon* is a kind of perpetual fugue, in which the different parts, beginning one after another, repeat incessantly the same air.——In Mathematics, it is a general rule for resolving all cases of a like nature in geometry, algebra, &c.

CANON'ICAL (*kanonikos*, from same *deriv.*), in Ecclesiastical Polity, signifies agreeable to the canons of a church; as, *canonical hours*, or hours prescribed by the canons for prayers.

CANONIZA'TION (*kanōn*, an example, or model: *Gr.*), an act of the Roman Catholic church, by which it takes upon itself to rank a deceased person in the catalogue of the saints; but the act is preceded by beatification, and by a kind of inquiry into the life and 'miracles' of the deceased. The life of the person proposed for examination is considered with special reference to the austerities and observances which the Roman Catholic church considers as indicative of sanctity.

CAN'ONRY, or CAN'ONSHIP, the benefice filled by a canon. It differs from a prebend, inasmuch as a prebend may subsist without a canonicate; whereas a canonicate always involves a prebend: again, the rights of suffrages, and other privileges, are annexed to the canonicate, and not to the prebend.

CANO'PUS, in Astronomy, a star of the first magnitude in the rudder of Argo, a constellation of the southern hemisphere. It is the α Argûs of astronomers. 'Sidus ingens et clarum,' a large bright star, wrote Pliny.

CAN'OPY (*kōnōpeion*, literally a mosquito curtain; from *kōnōps*, a gnat: *Gr.*), a magnificent covering raised over an altar, throne, chair of state, pulpit, &c, In figurative language the *sky* is called a canopy.

CANT, in Architecture, a term expressing the position of any piece of timber not standing square.——CANT-MOULDING, a moulding with a bevelled surface applied to the capitals of columns.——In Ship-building, CANT-TIMBERS are those timbers which are situated at the two ends of a ship, and *canted* or raised obliquely from the keel.

CANTAB'ILE (*Ital.*, from *canto*, I sing: *Lat.*), in Music, a term applied to movements intended to be in a graceful and melodious style.

CANTAN'TE (a singer: *Ital.*, from same), in Music, a term to denote the vocal part of the composition.

CANTA'TA (*Ital.*, from same), a song or composition, intermixed with recitative, airs, and different movements, chiefly intended for a single voice, with an instrumental accompaniment.

CANTEE'N (*cantine*: *Fr.*), a public-house licensed in every barrack or fort to sell liquors. Also a semi-cylindrical tin-case over a soldier's knapsack, to carry his cooked victuals in.

CANTHAR'IDES (*Gr.*), the plural form of *Cantharis*, the name of a genus of beetles, including the *C. vesica*, or Spanish-fly, extensively used in this country as a material for raising blisters. The beetle is found generally in the south of Europe, but our chief supply comes from Spain. It is usually about half an inch in length, of a shining green colour, but of a fœtid smell. Taken internally they are a most energetic acrid poison.

CANTHAR'IDIN (from *cantharides*), that peculiar substance existing in cantharides, which causes vesication.

CAN'THARUS (*kantharos: Gr.*), in Antiquity, a tankard sacred to Bacchus.

CAN'THI (*kanthos*, the corner of the eye: *Gr.*), in Anatomy, cavities at the extremities of the eyelids, commonly called the corners of the eye: the internal or greater canthus is next the nose; the external or lesser near the temple.

CAN'TICA (*Lat.*), songs in Roman comedy sung to music by one person, and supposed to have been introduced as interludes.

CAN'TICLES (*canticulum*, a little song: *Lat.*), the Song of Songs, in the Bible. It is supposed by some to be a marriage song written by Solomon, and must be explained by compositions of a similar nature in Eastern countries. Other writers consider it to be a series of sacred idyls, each distinct and independent of the other. It was forbidden to be read before a mature age by the Jews and early Christians, lest it should be misunderstood.

CANTILE'NA (a song: *Lat.*), in Music, the treble melody, or upper part of any composition.

CAN'TO (a song: *Ital.*), a part or division of a poem, answering to what in prose is called a book. In Music, it signifies the first treble, or highest vocal part.

CAN'TON, a small division: hence, in Heraldry, a small square, separated from the rest of the coat, is called a *canton*.——In Military affairs, troops billeted into different quarters or divisions are said to go into *cantonments*.——In Geography, a small district of territory, constituting a distinct state or government: as the cantons of Switzerland.

CAN'TONED, in Architecture, is when the corner of a building is adorned with a pilaster, an angular column, rustic quoins, or anything that projects beyond the level of a wall.——In Heraldry, a shield is cantoned by two lines proceeding from the top or sides, and meeting at right angles. A canton *dexter* is always meant, unless it is otherwise expressed.

CAN'VAS (*canevas: Fr.*; from *kannabis*, hemp: *Gr.*), a coarse sort of cloth, of which there are several kinds. Among others are —1. That worked regularly in little squares as a basis for tapestry; 2. That which is called buckram; 3. The cloth used for pictures; 4. That employed for sails of ships, tents, &c.

CAN'ZONE, or CANZO'NA (a song: *Ital.*), in Music, a song or air in two or three parts, with passages of fugue and imitation. The term is sometimes applied to a kind of lyric poem, in Italian, to which music may be adapted in the style of a cantata.

CANZONET' (*canzoneta*, the *dim.* of *canzone*, a song: *Ital.*), in Music, a short song, in one or two parts.

CAOU'CHOUC, or CAOU'TCHOUC, improperly called *elastic gum*, and more commonly *india-rubber*, is obtained from the milky juice of several plants and trees, particularly from the *Siphonia elastica* of Cayenne. Its elasticity is such that it can be stretched to a great extent, and its pliancy is increased by heat. From its softness, impermeability to water, &c., it is used in the manufacture of many articles. It is easily dissolved by purified naphtha obtained from coal tar, which does not change its properties, and the solution has been most extensively employed to give a thin covering to cloth, so as to render it impervious to moisture. It is also used for over-shoes, and, when dissolved in oil, forms a flexible varnish. Caoutchouc is principally obtained from South America, but latterly it has been imported in great quantities from Africa and Asia. It is usually brought to Europe in the form of pear-shaped bottles, which are formed by allowing the juice to flow from the tree over a mould of clay, then drying by exposure to the sun or to the smoke of burning fuel, after which the clay in the inside is moistened with water, and picked out.——*Vulcanized india-rubber*. In its ordinary state, india-rubber becomes rigid by cold, and soft by heat: hence it loses its value in hot or cold countries; but when combined with a little sulphur, at a temperature of 320° F. (this process being termed vulcanization), it becomes highly elastic: it is not affected by the most intense cold, nor by a temperature less than that which is sufficient to char it; moisture, however long continued, seems to produce no action upon it; and it is unaffected by any of the ordinary solvents, such as grease, oils, ether, turpentine, naphtha, or acid solutions. In this state it is very largely employed in the arts. Subjected to a higher degree of heat, and for a longer time, it is converted into *Hard india-rubber*, *Ebonite*, or *Vulcanite*, and in this condition it can be employed in the place of bone and wood for a great number of articles, such as knife-handles, combs, cups, and boxes.

CAP (*caput*, the head: *Lat.*), a part of dress made to cover the head. The use of caps and hats is referred to the year 1449, the first seen in Europe being at the entry of Charles VII. into Rouen: from that time they began to take the place of hoods or chaperons.——CAP, in Architecture, the uppermost part of any assemblage of principal or subordinate parts.——In Ship-building, a square piece of timber which is placed over the head or upper end of a mast.——In Botany, the *pileus*, or top of the fungus, generally shaped like a bonnet. ——CAP OF MAINTENANCE, one of the ornaments of state, carried before the kings of England at their coronation. It is of crimson velvet, faced with ermine; and is also frequently met with above the helmet, instead of wreaths, under gentlemen's crests, &c.——CAP-A-PIE (*Fr.*), from head to foot.

CAPA'CITY (*capacitas*, from *capax*, able to hold: *Lat.*), in a general sense, means the power of containing or holding.——In Chemistry, that quality of bodies by which, according to some theorists, they absorb and contain heat, which was considered an imponderable fluid.——In Geometry, the solid contents of a body.

CAPE (*caput*, a head: *Lat.*), in Geography, a part of a continent projecting into the sea, as the Cape of Good Hope, Cape St. Vincent, &c.

CAPEL'LA (a kid: *Lat.*), a star of the first magnitude in the constellation of the Charioteer; it is the Aurigæ of astronomers. Its distance from the earth has been calculated at 390,000 millions of miles, and yet its spectrum has been photographed by the scientific man. The light that effected the impression on the sensitive plate must have left the star 68 years before.

CA'PERS, the pickled flower-buds of the *Capparis spinosa*, a shrub belonging to the nat. ord. *Capparidaceæ*, growing in the south of Europe.

CA'PET, the name of the French race of kings, which has given 118 sovereigns to Europe, viz. 36 kings to France, 22 kings to Portugal, 5 kings to Spain, 11 kings to Naples and Sicily, 8 kings to Hungary, 3 kings to Navarre, 3 emperors to the east, 17 dukes to Burgundy, 12 dukes to Brittany, 2 dukes to Lorraine, and 4 dukes to Parma.

CA'PIAS (you are to take: *Lat.*), in Law, certain writs by one of which, the *capias ad respondendum*, a party is arrested at the commencement of a suit, if there is ground for supposing that he is about to fly the country. Another is the *capias ad satisfaciendum* (called briefly *Ca. Sa.*), a writ of execution, by which the sheriff is commanded to take the body of the defendant in execution.

CAPIL'LAIRE, a kind of syrup in which the Maiden-hair fern, *Adiantum capillus veneris*, is an ingredient.

CAPIL'LARY (*capillus*, a hair: *Lat.*), an epithet given to things on account of their hair-like fineness.——**CAPILLARY ATTRACTION**, or **CAPILLARITY**, that property which causes fluids to rise, contrary to gravity, when in contact with other bodies. If a piece of clean sheet glass is placed partly in water, the fluid will rise at each side. If a fine tube is treated in the same way the fluid will rise in the tube above the level of the rest, and the finer the tube the higher it will rise.——**CAPILLARY ORES**, in Mineralogy, the same with those otherwise denominated arborescent, or striated.——**CAPILLARY TUBES**, tubes of hair-like fineness.——**CAPILLARY VESSELS**, in Anatomy, the smallest and extreme parts of the ramifications of the veins and arteries.

CAP'ITAL (*capitalis*, important; from *caput*, the head: *Lat.*), in Commerce, the fund or stock, in money and goods, of a merchant, manufacturer, &c., or of a trading company.——**CAPITAL**, in Architecture, the uppermost part of a column or pilaster, serving as the head or crowning, and placed immediately over the shaft, and under the entablature.——**CAPITAL**, in Geography, the metropolis, or chief city or town of an empire, kingdom, state, or province.

CAPITAL PUN'ISHMENT (*caput*, physical life; literally, the head: *Lat.*), the extreme penalty of the law, by which the criminal's life is taken.

CAP'ITATE (*capitatus*, *Lat.*), in Botany, that which has a head or thickened summit.

CAPITA'TION (*capitatio*, a poll-tax; from *caput*, the head: *Lat.*), a tax or imposition levied on each person in a state. It is a very ancient kind of tribute, and answers to what the Latins called *tributum*, by which taxes on persons are distinguished from taxes on merchandise, called *vectigalia*.

CAP'ITE (*caput*, the head: *Lat.*), in Law, a sort of ancient tenure, by which a man held lands of the crown, by knight's service or in socage.

CAP'ITOL (*caput*, a head: *Lat.*), a collection of buildings in ancient Rome, on the Mons Capitolinus, in one of which the senate assembled. On the same spot is still the city-hall or town-house, where the conservators of the Roman people hold their meetings. It is asserted, but without much authority, that it was thus called on account of the head of a person named *Tollus* having been found in digging its foundations; but the appellation is sufficiently accounted for by its being the chief post of the city. The ascent to it was by 100 steps; and among the other structures it contained was the magnificent temple of Jupiter, both the inside and outside of which were enriched with numerous ornaments, the most splendid being the statue of that deity. Augustus gave to this temple 2,000 lbs. weight of gold; the gilding of its arch cost 21,000 talents; and its gates were of brass, covered with gold.

CAP'ITOLINE GAMES, annual games said to have been instituted by Camillus, in honour of Jupiter Capitolinus, and in commemoration of the preservation of the capitol from the Gauls. There was also another kind of Capitoline games, instituted by Domitian, and celebrated every five years, at which rewards and crowns were bestowed on the poets, champions, orators, historians, &c.

CAPIT'ULA RURA'LIA (rural chapters: *Lat.*), assemblies or chapters held by rural deans and parochial clergy within the precinct of every district deanery.

CAPIT'ULARY (*capitulum*, a chapter: *Lat.*), the body of laws or statutes of a chapter, or of an ecclesiastical council.

CAPITULA'TION (*capitulum*, a head: *Lat.*; in the original sense, a drawing up of the different heads of agreement), in Military affairs, a treaty made between the garrison of a place besieged and the besiegers, for yielding on certain conditions. The term is also applicable to the surrender of troops in any situation in which they are compelled to submit to a victorious enemy.

CAPIT'ULUM (*Lat.*, from *caput*, the head), in Antiquity, a transverse beam in the military engines of the ancients, having holes for the strings with which they were set in motion.——In Anatomy, the small head, or protuberance of a bone received into the concavity of another.——In Botany, a mode of inflorescence, when several flowers form a kind of *head* or ball.

CAP'NIAS (smoky, from *kapnos*, smoke: *Gr.*), in Mineralogy, a kind of jasper, of a smoky colour.

CAPONNIE'RE, in Fortification, a covered lodgment placed in the glacis, at the extremity of the counterscarp, and in dry moats, with embrasures or loopholes through which the soldiers may fire.

CAPO'TE (*Fr.*), a great-coat, with a hood or cowl, which is sometimes worn by sentinels in bad weather.

CAP'PARIS (*Gr.*). [See CAPERS.]

CAPRE'Æ (*capra*, a goat: *Lat.*), in Zoology, a family of mammalian quadrupeds, including the common goat, the Cashmere goat (whose wool is the material of which Cashmere shawls are made), and the ibex or steinbock, which inhabits various mountain ranges in Europe.

CAP'REOLATE (*capreolus*, a tendril: *Lat.*), in Botany, having the tendrils, or filiform spiral claspers, by which plants fasten themselves to other bodies, as in vines, peas, &c.

CAPRE'OLUS (*Lat.*), in Anatomy, the helix of the ear.——In Botany, the clasp or tendril of a vine or other plant.

CAPRIC'CIO (a whim: *Ital.*), in Music, the term for that irregular kind of composition in which the composer, without any restraint, follows the bent of his humour. It denotes also that the movement before which it is written is to be in a free and fantastic style.

CAP'RICORN (*caper*, a he-goat; and *cornu*, a horn: *Lat.*), in Astronomy, a southern constellation, and one of the twelve signs of the zodiac, which the sun enters on the 21st December.——TROPIC OF CAPRICORN, a small circle of the sphere, parallel to the equinoctial, passing through the beginning of Capricorn or the winter solstice, which is the sun's greatest southern declination, viz. 23½ degrees.

CAPRIFICA'TION (*caprificus*, the goat-fig, the *wild fig tree*: *Lat.*), a method used in the Levant for ripening the fruit of the domestic fig tree, by means of insects bred in that of the wild fig tree. The caprification of the ancient Greeks and Romans corresponds in every circumstance with what is practised at this day in the Archipelago and in Italy. Ancient writers agree in declaring that the wild fig tree, *caprificus*, never ripened its fruit, but was absolutely necessary for ripening that of the garden or domestic fig tree, over which husbandmen suspended its branches.

CAP'RIOLES (*capreolus*, a wild goat: *Lat.*), in Horsemanship, are those leaps which a horse makes in the same place without advancing, in such a manner that when he is at the height of the leap, he jerks out with his hind legs.

CAP'SICUM, a genus of South American plants, belonging to the order *Solanaceæ*. Their ground capsules and seeds afford the red or Cayenne pepper of our tables.

CAP'STAN (*cabestan*: *Fr.*), in a ship, a strong massy column of timber, of the nature of a windlass, which is placed behind the mainmast, and is used for weighing, or raising up anchors, or any other purpose for which great power is required.

CAPSULA'RES ARTE'RIÆ (*capsula*, the *dim.* of *capsa*, a box: *Lat.*), in Anatomy, the arteries of the renal glands, so called because they are enclosed by a capsule.

CAP'SULE (same *deriv.*), in Botany, a dry seed vessel, opening by valves or pores. The seed vessels of the foxglove and the poppy may be taken as examples.——In Chemistry, a porcelain or other dish for boiling or evaporating.

CAP'TAIN (*capitaine*: *Fr.*; from *caput*, head: *Lat.*), in the Army, the commander of a company of foot or of a troop of horse; and in the Naval or merchant service, the commander of a vessel.——A CAPTAIN-LIEUTENANT is an officer in the guards who, with the rank of captain and pay of lieutenant, commands a company or troop.——A POST-CAPTAIN, in the British navy, is an officer commanding any man-of-war, from a ship of the line down to a ship-rigged sloop.

CAP'TION (*captio*, a taking; from *capio*, I take: *Lat.*), in Law, the act of taking any person by any judicial process.

CAP'UCHINS, an order of Franciscan friars in the Roman Catholic church, so called from the *capuche* or hood sewed to their habits, and hanging down their backs.

CA'PUT (*Lat.*), in Anatomy, the HEAD, which is divided into the skull (*cranium*) and the face (*facies*). The skull consists of the crown, or *vertex*; the posterior part, or *occiput*; the anterior part, or *sinciput*; and the temples, or *tempora*.——CAPUT OBSTIPUM, a wry neck, which is generally a spasmodic disorder.

CA'PUT MOR'TUUM (a dead head: *Lat.*), in Chemistry, the residuum in the retort after the operation of distilling.

CAPYBA'RA (*Hydrochærus capybara*), a large rodent animal, sometimes called the water hog, which inhabits the neighbourhood of lakes and rivers in South America. It may be likened to a colossal guinea-pig. It feeds on fish and vegetables. It is of a sluggish disposition, is easily tamed, and enjoys having its skin rubbed like a pig. Its body is covered with coarse brown hair. It utters a low peculiar grunt. Specimens have been brought alive to this country.

CAR'ABINE, or CAR'BINE (*Fr.*), a short gun used by cavalry soldiers.

CARACA'RAS, birds of prey, inhabiting South America, and belonging to the Falcon family. The caracara eagle (*Polyborus brasiliensis*) derives its common name from its cry. It is a carrion feeder, and, like the rest of its tribe, has its cheeks and part of its throat bare of feathers.

CAR'ACOLE (*Fr.*), the half wheel which a horseman makes either to the right or left. The cavalry make a caracole after each discharge, in order to pass to the rear of the squadron.

CAR'ACOLY, a mixture of gold, silver, and copper, of which are made rings and other ornaments, for bartering with savage tribes.

CA'RAITES, a sect among the Jews which adheres closely to the text and letter of the Scriptures, rejecting the rabbinical interpretations and the cabala.

CARAM'BOLA, the fruit of some East Indian plants belonging to the genus *Averrhoa*: nat. ord. *Oxalidaceæ*. It is intensely acid, and is only tolerable to Europeans in the shape of pickles.

CAR'AMEL, burnt sugar, used for colouring spirits or gravies. It is a shining black substance, soluble in water, which it renders brown. The French dissolve it in lime water.

CARAPA'CE, the hard external coat with which certain animals, such as the armadillo and the tortoise, are covered. The shell protecting the body of the crab is called the carapace.

CAR'AT, or CAR'ACT (*kyrat*, a weight: *Arab.*), the twenty-fourth part of an ounce Troy. It is a term employed in speaking of the fineness of gold. Pure gold is 24-carat gold, whilst 23-carat gold is the metal alloyed with one twenty-fourth by weight of copper. The British gold coinage is 22 carats fine, that is, one-twelfth of the whole weight is composed of copper. What is called jeweller's gold is a much debased form of the metal, the usual degree of fineness being 16 carats, that is, only two-thirds of the total weight are gold.——**Carat**, a weight of four grains, employed in weighing precious stones.

CARAVAN' (*carvan*, a trader: *Pers.*), in the East, a company of travellers, and more particularly of merchants, who, for greater security, proceed in a body through the deserts of Arabia, or any other region infested with robbers. Such a company often has more than a thousand camels to carry the baggage and goods; and, as the travellers walk in single file, the line is often a mile long. Proper officers, the chief of whom has the title of *Caravan-Bachi*, are appointed to regulate everything during their march.

CARAVAN'SERA, or CARAVAN'SERY (*cairawan: Arab.*), a large building or inn for the reception of travellers and the caravans. It commonly forms a square, in the middle of which is a spacious court; and under the arches or piazzas that surround it there runs a bank, raised some feet above the ground, where the merchants and travellers take up their lodgings, the beasts of burden being tied to the foot of it. In the upper part there are generally private apartments, the use of which is costly. In many cases, however, the hospitality is gratuitous, it being by no means uncommon for a pious Mussulman to establish, during his life or by will, one or more of these caravanseries.

CAR'AWAY, an umbelliferous plant, the *Carum carui* of botanists, the seeds of which have an aromatic smell and a warm pungent taste. Caraway seeds are used in cakes, &c., and are distilled with spirituous liquors.

CAR'BON (*carbo*, charcoal: *Lat.*), an elementary body, the essential part of charcoal. Though this substance abounds throughout the vegetable kingdom, and is also contained in animal and even mineral bodies, yet it is very rarely to be met with in a state of absolute purity. The diamond is nothing but pure crystallised carbon. For many ages the diamond was considered as incombustible; and Newton was the first who conjectured, from its great refractive power, that it was capable of combustion. Graphite, or plumbago, is nearly pure carbon. Coal consists in great part of carbon. By the union of carbon with oxygen, it produces two gaseous substances, the first of which is *carbonic acid*, formerly called *fixed air*; and the second, containing less oxygen, *carbonic oxide*.

CAR'BONATE, in Chemistry, a compound formed by the combination of carbonic acid with different bases, as carbonate of copper, carbonate of lime, &c.

CARBON'IC ACID, in Chemistry, a colourless elastic fluid, a compound of one atom of carbon and two of oxygen, formerly called *fixed air*: it is one and a half times heavier than atmospheric air. It will neither support animal life nor combustion. It is liquefied by a pressure of thirty-six atmospheres, or 540 lbs. to the square inch; and the resulting liquid solidifies by spontaneous evaporation. It is the gas which is generated by fermentation, and which so often proves destructive to those who inhale it in mines, wells, or very confined apartments. All kinds of spring and well water contain carbonic acid, which they absorb from the atmosphere, and to which they are partly indebted for their agreeable flavour; but water is wholly deprived of it by boiling. It renders lime water turbid, if transmitted through it, carbonate of lime being formed. The effervescence of the so-called soda-water is due to the escape of this gas which had been forced into the liquid. All the limestone and chalk of the earth consists chiefly of a carbonate of lime.

CARBONIF'EROUS SYS'TEM, in Geology, a series of strata belonging to the Primary, or Palæozoic period. It is divisible into two parts. The lower portion includes the mountain limestone formation, rich in organic remains, and largely developed in the north of England, where it sometimes attains the thickness of 900 feet. The upper portion contains the millstone grit, a coarse quartzose sandstone with beds of shale, sometimes 600 feet thick; and the coal measures, so important for the immense mass of vegetable remains they contain in England, North America, and elsewhere. In the north of England the coal measures have a thickness of 3,000 feet. The carboniferous flora abounded in coniferous trees, ferns, mosses, equiseta, and plants belonging to families that are not now existing. [See Coal.]

CARBUN'CLE, in Surgery, an inflammatory tumour, or painful gangrenous boil, which being seated deeply, in parts provided with cellular membrane, does not soon discover its whole dimensions, nor the matter it contains.——It is also the name of a very beautiful gem, of a deep red or scarlet colour, known to the ancients as the *anthrax*. When this is held up against the sun, it loses its deep tinge, and becomes exactly of the colour of burning charcoal, whence the propriety of the name given to it. It has, however, been supposed by some modern mineralogists that the carbuncle of the ancients was garnet.——**Carbuncle**, in Heraldry, a charge or bearing, consisting of eight radii, four of which make a common cross, and the other four a saltier.

CAR'BURET, in Chemistry, a substance formed by the combination of carbon with metals and other simple combustibles.

CAR'BURETTED HY'DROGEN GAS, two compounds, consisting of hydrogen and carbon: the one called *light* carburetted hydrogen is composed of six parts by weight of carbon and two of hydrogen. It is inflammable, and is the marsh gas of pools, and the fire-damp of mines. The other compound is OLEFIANT GAS, which see.

CAR'CANET (*carcan*, a collar: *Fr.*), in Archæology, a chain for the neck.

CAR'CASS, in Building, the shell of a house, before it is lathed and plastered or the floors laid.——In Gunnery, an iron case or hollow vessel, of an oval figure, filled with combustible and other substances, to be thrown from a mortar into a town, to set fire to buildings. It has two or three apertures from which the fire blazes, and its light is sometimes used for ascertaining the direction in throwing shells. It is furnished with pistol barrels, loaded with powder to the muzzle, which explode as the composition burns down to them.

CARCINO'MA (a cancer: *Gr.*), in Medicine, a cancerous tumour. Also a disease in the cornea of the eye.

CAR'DAMOMS (*cardamom*, a cress: *Gr.*), the seeds of several closely allied plants growing in India and Ceylon, and belonging to the nat. order *Zingiberaceæ*. They are aromatic and stimulating.

CAR'DIALGIA (*kardia*, the heart; *algos*, grief: *Gr.*), the heartburn, a hot sensation in the throat arising from indigestion.

CAR'DINAL (*cardinalis*, from *cardo*, a hinge: *Lat.*), that on which anything turns; and, metaphorically, anything which is chief or principal. Thus Justice, Prudence, Temperance, and Fortitude, are called the four *cardinal virtues*.——In the Roman hierarchy, an ecclesiastical prince, who has a voice in the conclave at the election of a pope, and who may be advanced to that dignity himself. He is generally a bishop, though, as a cardinal, he may be only a *priest*, *deacon*, or *subdeacon*. Thus the famous Richelieu was a cardinal priest, and Mazarin only a cardinal deacon. There are about seventy cardinals, and when assembled they compose the Sacred College. They form the Pope's Council, and preside at special and general congregations. When the pontifical throne is vacant they govern the church. The red hat they wear was first given by Innocent III. in 1245; and their purple dress by Boniface VIII. in 1294. A cardinal is addressed as 'Your Eminence.' [See POPE.]——The CARDINAL NUMBERS are one, two, three, &c., in distinction from the ordinal numbers, first, second, third, &c.——The CARDINAL POINTS of the compass are the north, south, east, and west.——The CARDINAL SIGNS, in Astronomy, are Aries, Libra, Cancer, and Capricorn.

CAR'DINAL-FLOWER, an ornamental garden plant belonging to the genus *Lobelia*.

CAR'DING MACHINE (*carder*, to comb: *Fr.*), an instrument of modern invention for combing and cleansing wool and cotton. It consists of cylinders, thick-set with teeth, and put in motion by the force of water, steam, &c.

CAR'DIOID (*kardia*, the heart: and *eidos*, form: *Gr.*), in Mathematics, an algebraic curve, so called from its resemblance to a heart.

CARDI'TIS (same *deriv.*), in Medicine, inflammation of the heart.

CAREEN'ING (*carina*, the keel: *Lat.*), in Sea language, the bringing a ship to lie on one side in order to clean and caulk the other.

CAR'GO (*carico*, a burden: *Ital.*), the goods, merchandise, and effects which are on board a ship, exclusive of the crew, rigging, ammunition, provisions, guns, &c. The lading within the hold is called the *inboard cargo*, in distinction from horses, cattle, &c., carried on deck.

CARIBS, a race identical in outward appearance with the African negro, found in the Caribbean Islands, when Europeans first visited them. They afterwards decreased in number, and the remainder of them was transported to the Bay of Honduras, where their descendants are still to be found.

CAR'ICA (a dried fig: *Lat.*). [See PAPAW.]

CAR'ICOUS (*carica*, a dried fig: *Lat.*), in Medicine, an epithet given to tumours resembling a fig.

CARIL'LON (a chime: *Fr.*), a species of chime frequent in the Low Countries, particularly at Ghent and Antwerp, and played on a number of bells in a belfry, forming a complete series or scale of tones or semitones.

CAR'INATED (*carinatus*, from *carina*, a keel: *Lat.*), in Botany, applied to anything provided with a keel.

CAR'LINE, a piece of timber in a ship, ranging fore and aft, from one deck beam to another, directly over the keel, and serving as a foundation for the body of the ship. *Carline knees* are timbers lying across from the sides to the hatchway, and serving to sustain the deck.

CAR'LOCK, a kind of isinglass obtained from Russia, made of the sturgeon's bladder, and used in clarifying wine.

CAR'MELITES, an order of mendicant friars, very numerous in Italy and Spain. Their name is founded on their assertion that they derive their origin, through an uninterrupted succession, from Elijah, Elisha, and the children of the prophets, who, they say, were the founders of their order on Mount Carmel. They wear a scapulary, or small woollen habit, of a brown colour, thrown over the shoulders.

CARMIN'ATIVES (*carmen*, a charm: *Lat.*), medicines which expel wind, promote perspiration, and are antispasmodic.

CAR'MINE (*Fr.*), a red pigment procured from cochineal, employed by water-colour painters. Rouge is a preparation of carmine.

CARNA'TION (*caro*, flesh: *Lat.*, from its colour), a beautiful plant, obtained from the wild *Dianthus caryophyllus*, having its bright colours equally marked all over the flowers.——In Painting, flesh colour.

CARNE'LIAN (same *deriv.*), a precious stone, either red, flesh-coloured, or white. The finest carnelians are those of the East Indies: there are some beautiful ones in the rivers of Silesia and Bohemia, and some of a quality not to be despised in Britain. They are made into seals, brooches, &c.

CAR'NIVAL (*carni vale*, farewell to flesh: *Lat.*), the feast or season of rejoicing previous to Lent, celebrated with great spirit throughout Italy, when there are numerous feasts, balls, operas, concerts, masquerades, &c. The churches are filled with choristers, and the streets with masks. This festival flourishes more particularly at Rome. It is celebrated during the week before the commencement of Lent.

CAR'OB-TREE (*karob: Arab.*), the *Ceratonia Siliqua*, a native of Spain, Italy, and the Levant. It is an evergreen tree, belonging to the nat. ord. *Leguminosæ*, and produces long, flat, brown-coloured pods, composed of a mealy succulent pulp, of a sweetish taste. Though not accounted very wholesome, these pods are often eaten by the poorer classes in times of scarcity; and form an excellent food for cattle. The bean-like seeds are hard and useless. This tree is thought by some to be that which bore the 'locusts' eaten by St. John in the wilderness.

CAROLIT'IC COL'UMNS, in Architecture, columns with foliated shafts, decorated with leaves and branches winding spirally around them, or forming crowns and festoons.

CA'ROLUS (Charles: *Lat.*), a gold coin first struck in the reign of Charles I., and then valued at twenty shillings, but afterwards current at twenty-three.

CAROT'ID AR'TERIES (*karoo*, I put into a deep sleep: *Gr.*), in Anatomy, two arteries in the neck, which convey the blood from the aorta to the brain. If these vessels are tied, the animal goes to sleep: hence the name.

CARP (*carpe: Fr.*), the *Cyprinus carpio* of ichthyologists, a common fish in ponds. Carps breed rapidly, grow to a large size, and live to a great age; but they are greatly indebted to cooks, says Yarrell, for the estimation in which they are held. Our petted gold fish is a carp introduced from China.

CAR'PENTER'S RULE, an instrument marked with a scale of feet, inches, &c., and with tables of figures for facilitating calculations.

CAR'PENTRY (*carpentum*, a two-wheeled carriage: *Lat.*), the art of cutting, framing, and joining timber in the construction of buildings; it is subservient to architecture, and is divided into *house-carpentry* and *ship-carpentry*.

CAR'POLITE (*karpos*, fruit; and *lithos*, a stone: *Gr.*), petrified fruits, the most remarkable of which are nuts converted into silex.

CARPOL'OGY (*karpos*, fruit; and *logos*, a discourse: *Gr.*), that branch of Botany which treats of fruits.

CAR'PUS (*karpos*, the wrist: *Gr.*), in Anatomy, the wrist. The human wrist is composed of eight bones, forming an arch, the convexity of which is next the arm. These bones consist of two rows of four each, the first row articulating above with the radius, and the second row with the metacarpal bones, i. e. those forming the palm of the hand.

CAR'RACK (*Port.*), a large armed vessel, employed by the Portuguese in the East Indian and Brazilian trade.

CARRA'RA, a hard white kind of marble, somewhat resembling the Parian; so called from the town of Carrara, in Italy, where it is found. It is largely employed by sculptors. Geologists believe that the fine crystalline grain is the effect of subterranean heat.

CAR'RICK-BITTS, in a ship, the bitts which support the windlass.——CARRICK-BEND, a particular kind of knot.

CAR'RONADE (from *Carron*, a village in Stirlingshire, where it was first made), a short piece of ordnance, having a large bore, and a chamber for the powder, like a mortar.

CARTE (*Fr.*), in Fencing, a thrust at the inside of the upper part of the body.

CARTE-BLANCHE (a white card: *Fr.*), a blank paper, signed at the bottom with a person's name, and given to another with permission to fill it up as he pleases; applied generally in the sense of unlimited powers being granted.

CAR'TEL (*Fr.*), a challenge. Also an agreement between two states for the exchange of their prisoners of war.——CARTEL-SHIP, a ship commissioned in time of war to exchange the prisoners of any two hostile powers; also to bring any particular request from one power to another. The officer who commands her is ordered to carry no cargo, ammunition, or implements of war, except a gun for the purpose of firing signals.

CARTE'SIANS, those who adhere to the opinions of Descartes. This philosopher has laid down two principles, the one metaphysical, the other physical. The metaphysical proposition is this:—'I think, therefore I am;' the physical one—'Nothing exists but substance.' He makes substance of two kinds; the one that which thinks, the other that which is extended; whence actual thought and actual extension are the essence of substance.

CARTHAGI'NIAN, a native of ancient Carthage, or something pertaining to that celebrated city, which was situated on the northern coast of Africa, about twelve miles from the modern Tunis. It was founded by the Phœnicians, and destroyed by the Romans.

CARTHU'SIANS, a religious order, founded in the year 1086 by St. Bruno. They received their name from Chartreuse, the place of their institution; and are remarkable for their austerity, as their rules do not permit them to speak to any person without leave, or to quit their cells.

CAR'TILAGE (*cartilago: Lat.*), or, in common language, GRISTLE, a tough flexible substance of the animal body. Bones first appear as cartilage, and then become gradually strengthened by the deposit of earthy matter therein.

CARTILA'GINOUS FISHES (*cartilaginosus*, having cartilage: *Lat.*), those having cartilaginous instead of bony skeletons. Many of them are viviparous, as the ray and shark; others oviparous, as the sturgeon.

CARTOO'N (*cartone*, pasteboard: *Ital.*), a design drawn upon large sheets of paper for the purpose of being traced upon any other substance, on which the subject is to be executed. The most celebrated cartoons in existence are those of Raphael, seven of which are at Hampton Court; they were originally designed for tapestry.

CARTOUCH' (a cartridge: *Fr.*), a case of wood holding about four hundred musket-balls, besides from six to ten iron balls to be fired out of a howitzer. Also, a portable box for charges.——In Architecture, CARTOUCHES are blocks or modillions used in the cornices of wainscoted apartments; also ornaments representing a scroll of paper.——Champollion gave this name to the mark cut round the hieroglyphic figures indicating a royal name on the sculptured stones of Egypt. It is now believed to be the outline of a signet ring.

CAR'TRIDGE (*carte*, pasteboard: *Fr.*), a case of paper, &c., filled with gunpowder, and used in the charging of guns. The cartridges for cannon and mortars are made of pasteboard, tin, or wood, but most frequently of flannel: those for small arms, prepared for battle, contain both powder and ball. Cartridges without balls are called *blank cartridges*.——CARTRIDGE-BOX, a case of wood covered with leather, with cells for cartridges. It is worn upon a belt thrown over the left shoulder.

CAR'TULARY, or CHAR'TULARY (*charta*, paper: *Lat.*), a register-book, or record, as that of a monastery.

CAR'UCATE (*charrue*, a plough: *Fr.*), in old deeds, as much land as one team can plough in a year.

CAR'UNCLE (*caruncula*, a *dim.* of *caro*, flesh: *Lat.*), in Surgery, a small fleshy excrescence, either natural or morbid. In Botany, a fleshy protuberance seen upon some seeds, for example, those of the common milkwort, *Polygala vulgaris*.

CARYAT'IDES, in Architecture, columns or pillars shaped like the bodies of females. They were first erected as trophies, and were intended to represent the women of the city of Caryæ in Arcadia, who were taken captive by the Athenians, after the men had been slain for joining the Persians after the battle of Thermopylæ.

CARYOPHYL'LACEÆ (*karuon*, a nut; and *phullon*, a leaf: *Gr.*), a nat. ord. of polypetalous plants, natives chiefly of the cold and temperate parts of the world. The majority are mere weeds, but it includes those favourite garden flowers, the pinks, carnations, and lychnis, as well as the corn-cockle.

CAS'CABEL, the knob at the end of a cannon: it serves for a handle.

CASCA'DE (*Fr.*; from *casus*, a fall: *Lat.*), a small waterfall, either natural or artificial. The word is applied to such as are less than a cataract.

CASCARIL'LA (a *dim.* of *cascara*, bark: *Span.*), originally applied to Peruvian bark, but now to the aromatic and tonic bark of various species of croton, euphorbiaceous shrubs growing in the West Indies and Mexico.

CASE (*casus*, from *cado*, I fall: *Lat.*), the particular state, condition, or circumstances that befall a person, or in which he is placed. ——Also (*casse*: *Fr.*) any outside covering which serves to enclose a thing entirely, as a packing-case or a knife-case. In Carpentry, the case of a door is the wooden frame in which it is hung. In Printing, the case is a frame of wood, with numerous small partitions for the letters.——CASE, in Grammar, the inflection of a noun implying an action on the thing named.——*Action on the case*, in Law, is an action in which the whole cause of complaint is set out in the writ.

CA'SE-HARDENING, a method of preparing iron, so as to render its outer surface hard, by converting it into steel.

CAS'EIN (*caseus*, cheese: *Lat.*), a component of milk and the principal part of curds. It closely resembles albumen, and consists of more than 50 per cent. of carbon with hydrogen, nitrogen and oxygen.

CA'SEMATE, in Fortification, a vault of mason's work in the flank of a bastion, next to the curtain, serving as a battery to defend the opposite bastion and the moat. Also a vaulted work, to protect the troops from shot and shell when not on duty.

CA'SEMENT, a window that opens on hinges. Also, a hollow moulding.

CA'SE-SHOT, or CAN'ISTER-SHOT, musket-balls, stones, old iron, &c., put into cases and discharged from cannon.

CASH (*caisse*: *Fr.*, literally a chest for keeping money), money in hand, or ready money, distinguished from bills and securities.

CASHEW-NUT (*caju*, native name), the produce of a Brazilian tree (*Anacardium occidentale*), belonging to the same order as the Pistacia of southern Europe and the Mango of India. The fruit of this tree is of a singular structure. It has an enlarged fleshy disk shaped like an apple, and to the apex of this is attached the kidney-shaped nut, of which the kernel is eaten, whilst from the shell is extracted an acrid inflammable oil employed in varnishes.

CASHI'ER (*caissier*, from *caisse*, a chest: *Fr.*), a person who is entrusted with the cash of some public company. In a banking establishment, the cashier has charge of the books, payments, and receipts; he also signs or countersigns the notes, and superintends all transactions, under the order of the directors.

CASH'MERE (from *Cashmere*, in Hindostan), a delicate woollen fabric, manufactured from the downy wool found about the roots of the hair of the Thibet goat. The fine *shawls* made of this material were first imported from Cashmere.

CASQUE (*Fr.*; from *cassis*, a helmet: *Lat.*), defensive armour, to protect the head and neck in battle.

CASSA'DA, or CASSA'VA, a coarse flour, prepared from the roots of two shrubs belonging to the euphorbiaceous genus *Jatropha*, growing in South America. It is largely consumed in that country in the shape of bread and cakes. *Tapioca* is the roasted starch extracted from the same roots. The juice of the bitter cassava plant (*Jatropha manihot*), abounds with prussic acid, and is poisonous, but it soon disappears on exposure to the air, or on the application of heat.

CASSA'TION, COURT OF (*casser*, to quash: *Fr.*), one of the most important institutions of modern France, which gives to the whole jurisdiction of that country coherency and uniformity, without endangering the necessary independence of the courts. It was established by the first national assembly, and has been preserved, in every essential respect, under all the changes of France since the great revolution. Cassation properly signifies the annulling of any act or decision, if the forms prescribed by law have been neglected or justice has been perverted.

CAS'SIA (*Gr.*), in Botany, a genus of leguminous plants, including many species. They grow in Arabia and Africa, and yield various products employed in medicine. Senna consists of cassia leaves. The bark called cassia, frequently used as a substitute for true cinnamon, is the bark of several species of *Cinnamomum*, belonging to the laurel family.

CAS'SIDA (a helmet: *Lat.*), a genus of beetles, often called *tortoise beetles*.

CAS'SIOBERRY BUSH, the *Viburnum levigatum* of botanists, a North American evergreen shrub, with white flowers and red berries.

CASSIOPE'A (*Gr.*), a constellation in the northern hemisphere, situated opposite the Great Bear, on the other side the pole. In the year 1572, a remarkable new star appeared in this constellation, surpassing Sirius or Lyra in brightness. It seemed to be larger than Jupiter; but after a few months it declined, and in a year and a half entirely disappeared.

CAS'SOCK (*casaque*, a great coat: *Fr.*), the vestment worn by clergymen under their gowns.

CAS'SOWARY, the *Casuarius galeatus* of ornithologists, belonging to the ostrich family. It is a native of Malacca and the Indian Archipelago. It is only exceeded in size by the ostrich. The wings are imperfectly developed, and it cannot raise itself in the air, but it runs with great swiftness. It carries on its head a sort of horn. The eggs are left in the sand to be hatched by the sun.

CAST (*kasta*, to cast: *Goth.*), among artists, any statue, or part of a statue, of bronze, plaster of Paris, &c. A cast is that which owes its figure to the mould into which the matter of it has been poured while in a fluid state; and thus differs from a model, which is made by repeated efforts with a ductile substance, as any adhesive earth; and from a piece of sculpture, which is the work of the chisel.

CASTA'NEA (a chestnut: *Lat.*), in Botany, a genus of amentaceous trees, including the Spanish chestnut, *Castanea vesca*.

CASTANET'S (*castagnettes*: *Fr.*, from last), instruments formed of small concave shells of ivory or hard wood, which are struck against one another, being fastened to the thumb and middle finger. The Spaniards and Moors use them as an accompaniment to their saraband dances and guitars.

CASTE, a name derived from the Portuguese settlers in India, and used to indicate the classes into which the population of India is divided according to the religious laws of Brahma. That of *Brahmins* is the highest; and though, strictly speaking, it should be devoted entirely to religious exercises, it mingles in the ordinary pursuits of life. That of *kshatriya* (protection) is the soldier class; that of the *vaisya* (wealth) is the commercial class; that of the *sudra* (labour) constitutes the tillers of the soil, and is so degraded that the reading of the sacred books is prohibited to it. A large part of the population does not, however, belong to any of the pure castes, but are the offspring of marriages between persons of different castes. It is said that there has been much exaggeration as to the strictness of caste regulations. A learned writer declares that almost every occupation is open to all the tribes alike. The limitations far from being rigorous reserve only one regular profession, that of the Brahmins, which consists in teaching the Vedas, and assisting at religious ceremonies. Rules of caste, however, are very often made an excuse for escaping the performance of disagreeable duties. The *pariahs*, and some others, are supposed to have no caste. The origin of the institution is unknown, but there are various absurd traditions connected with the subject. It is said that the Egyptians, and probably the Assyrians, also the Athenians and Cretans, in early times, were divided into castes.

CAS'TELLAIN (*castellum*, a castle: *Lat.*), in feudal times, the owner, lord, or governor of a castle or fortified place.

CAS'TING, with Founders, the running of metal into a mould; among Sculptors, the taking casts or impressions of figures, &c. [See FOUNDRY.]—CASTING, in Natural History, that process by which some animals shed their skins, horns, &c., when the old fall off to make room for the new.

CAS'TLE (*castellum*, a *dim.* of *castrum*, a camp: *Lat.*), a fortress or place rendered defensible either by nature or by art. English castles, designed for residence as well as defence, are for the most part of no higher date than the Conquest. Those previously erected had been suffered to fall into ruin; and many writers have assigned this circumstance as a reason for the facility with which William the Norman made himself master of the country. It was the policy of this able general to build a considerable number; and in process of time the martial tenants of the crown erected them for themselves; so that, towards the end of Stephen's reign, we are told that there existed upwards of eleven hundred. At this period castles were an evil of the greatest magnitude to both the sovereign and the subject; considerable struggles appear to have taken place with regard to their continuance; several were demolished; and their general decline commenced. A complete castle consisted of a ditch or moat; an outwork, called a barbican, which guarded the gate and drawbridge; an artificial mount; an outer and inner ballium or enclosure; and the keep, or lofty tower, in which the owner or governor resided, and under which were the dungeons.—

CASTLE-WARD, or **CASTLE-GUARD**, a tax imposed for the purpose of maintaining watch and ward within a castle.

CAS'TOR (*kastor*: *Gr.*), in Zoology, the *Beaver*. Also a reddish-brown substance, of a strong penetrating smell, taken from two oval pouches situated near the anus of the beaver; it is a powerful antispasmodic.

CAS'TOR OIL, an oil obtained from the seeds of the *Ricinus communis*, or Palma Christi, an East Indian tree with handsome palmate leaves belonging to the nat. order, *Euphorbiaceæ*.

CAS'TOR AND POL'LUX, two fine stars in the constellation Gemini. They are the α and β Geminorum of astronomers.

CAS'TORIN, or **CAS'TORINE** (*castorinus*, pertaining to the beaver: *Lat.*), in Chemistry, an animal principle obtained from *castor*, when it is boiled in alcohol.

CASTRAME'TATION (*castra*, a camp; *metor*, I set out: *Lat.*), the art of laying out a camp.

CAS'UISTRY (*casus*, a case: *Lat.*), the science of resolving cases of doubtful propriety, or of determining the lawfulness or unlawfulness of an act, by rules and principles drawn from the Scriptures, from the laws of society, or from reason.

CA'SUS BELLI (*Lat.*), a ground upon which to begin a war.

CA'SUS FŒD'ERIS (the case of the league: *Lat.*), the case stipulated by treaty, or which comes within the terms of compact.

CA'SUS OMIS'SUS (an omitted case: *Lat.*), a term used by lawyers with reference to a state of circumstances which has been unprovided for by a statute, treaty, &c., apparently by an oversight.

CAT. The wild cat, *Felis catus*, is found in the woods of Europe, but seems to be extirpated from those of our island, except in the north of Scotland. It destroys poultry and even lambs and kids. It seems to be doubtful whether our domestic cat is descended from it.——**CAT**, a term for a ship usually employed in the coal trade.——Also a sort of strong tackle for drawing up the anchor. And a military term for a kind of shed under which soldiers conceal themselves while filling up a ditch or mining a wall.

CAT'-HEAD, in Marine language, a strong beam projecting horizontally over a ship's bows.——**CAT-HARPINGS**, ropes serving to brace in the shrouds of the lower masts behind their respective yards.——**CAT'S-PAW**, a light breeze perceived in a calm, by a rippling on the surface of the water.

CAT'S-EYE, in Mineralogy, a sub-species of quartz, penetrated with fibres of asbestos. It is very hard and transparent, of a glistening grey, with a tinge of green, yellow, or white, much resembling the mutable reflections from the eye of a cat; and hence the name. It is found in Ceylon and Malabar.

CAT'S-TAIL GRASS, or **BULRUSH**, a water plant allied to the sedges, and belonging to the genus *Typha*. The common name has been suggested by the brown cylindrical heads forming the inflorescence.

CATACHRE'SIS (*Gr.*, from *katachraomai*, I abuse), in Rhetoric, a trope which borrows the name of one thing to express another. Thus Milton, in describing Raphael's descent from the empyreal heaven, says—

> 'Down thither prone in flight
> He speeds, and thro' the vast ethereal sky
> *Sails* between worlds and worlds.'

So in Scripture we read of the '*blood* of the grape.' A catachresis, in fact, is the abuse of a trope, or when a word is too far wrested from its original signification.

CATACLA'SIS (*Gr.*, from *kataclao*, I break in pieces), in Medicine, a breaking or distortion in general, but particularly that of the eyes.

CAT'ACOMB (*kata*, down; and *kumbos*, a hollow place: *Gr.*), a grotto or subterraneous place for the burial of the dead. The term is generally applied to a vast number of subterraneous sepulchres, in the Appian Way, near Rome, supposed to be the cells in which were deposited the bodies of the primitive Christian martyrs. But there are many other catacombs, as those in Paris, Naples, &c.

CATACOUS'TICS (*kata*, against; and *akoustikos*, belonging to hearing: *Gr.*), that branch of science connected with the laws of reflected sound, called also *cataphonics* (from *kata*, against; and *phōnē*, a voice: *Gr.*).

CATAGMAT'IC (*kata*, against; and *agmos*, the fracture of a bone: *Gr.*), in Anatomy, an epithet for that which has the quality of promoting the union of fractured bones.

CATALEP'SIS or **CAT'ALEPSY** (*katalēpsis*, from *katalambano*, I seize: *Gr.*), a kind of apoplexy, in which the patient is speechless, senseless, and fixed in one posture, with his eyes open, though without seeing or understanding.

CAT'ALOGUE RAISONNEE' (a methodical catalogue: *Fr.*), a catalogue of articles carefully classed, and accompanied with explanatory notes.

CATAL'PA (*Ind.*), in Botany, a genus of trees belonging to the Bignonia order. The *C. Syringæ folia*, a native of North America, is an ornamental tree in English pleasure-grounds.

CATAL'YSIS (*katalusis*, dissolution: *Gr.*), in Chemistry, the action possessed by some substances, of decomposing others with which they are in contact, without change to themselves. Thus, if binoxide of manganese be heated in contact with chlorate of potash, oxygen will be given off by the decomposition of the chlorate, whilst the manganese remains unaltered.

CATAMARAN', a sort of floating raft originally used as a fishing boat by the Indians on the Coromandel coast.——Also the floating batteries with which the French, at the commencement of this century, meditated the invasion of England.

CAT'AMOUNT, in Zoology, the wild cat, or cat of the mountain, of North America.

CAT'APHRACT (*kataphractēs*, a coat of mail; from *kataphrasso*, I shelter: *Gr.*), in the ancient military art, a piece of heavy defensive armour, formed of cloth or leather, strengthened with scales or links, and used to defend the breast or whole body, or even the horse as well as the rider.

CAT'APLASM (*kataplasma*, from *kataplasso*, I spread over: *Gr.*), a poultice applied to some part of the body, to excite or repel heat, or to relax the skin, &c. When mustard is an ingredient, it is called a *sinapism*.

CATAPUL'TA, or CAT'APULT (*catapulta*: *Lat.*; from *katapallo*, I shake down: *Gr.*), in Antiquity, a military machine used for throwing arrows, darts, and stones upon the enemy. Some of these engines projected stones of a hundred weight. Josephus takes notice of their surprising effects, and says that the stones cast out of them beat down the battlements, knocked off the angles of the towers, and levelled a whole file of men from one end to the other. The catapulta differed from the balista, inasmuch as the former threw stones only, whereas the latter threw darts and javelins. Both were strong *cross-bows*.

CAT'ARACT (*katarraktēs*, from *katarrēgnumi*, I break down: *Gr.*), a great fall of water over a precipice in the channel of a river, caused by rocks or other obstacles to the course of the stream; as that of Niagara, those of the Nile, the Danube, and the Rhine.——CATARACT, in Medicine, an affection of the crystalline lens of the eye, or its capsule, which becomes so opaque as to prevent the rays of light from passing to the optic nerve. *Incipient cataract* is only a suffusion of the eye, when little clouds seem to float before it. *Confirmed cataract* is when the front of the eye is either wholly or in part covered, so that the rays of light cannot pass to the retina.

CATARRH' (*kattarrheo*, I flow down: *Gr.*), commonly denominated a *cold*, is an increased secretion of mucus from the nose, fauces, and bronchiæ, with fever, cough, lassitude, &c. When a catarrh is epidemic, it is called an *influenza*.

CAT'ARRHINE (*kata*, downwards; *rhin*, the nose: *Gr.*), a term applied by zoologists to the monkeys of the *old* world, which have the division between the nostrils wedge-shaped. It is in contradistinction to *platyrrhine* (*platus*, broad; *rhin*, the nose: *Gr.*), a term applied to the monkeys of the *new* world, which have the nasal septum hour-glass shaped. In the former the lower angles of the nostrils rapidly converge over the mouth; in the latter they diverge.

CATAS'TASIS (*Gr.*, from *kathistēmi*, I arrange). In Poetry, the third part of the ancient drama: being that in which the plot, or action, is supported, carried on, and heightened till it is ripe for unravelling in the catastrophe.

CATAS'TROPHE (*Gr.*, from *katastrepho*, I bring to an end), in Dramatic Poetry, the fourth and last part in the ancient drama, or that immediately succeeding the catastasis. It consists in the unfolding and winding up of the plot, clearing up difficulties, and closing the play. A fall from grandeur to extreme misery, banishment, death, &c., form a catastrophe, in tragedy; marriage, in comedy.

CATCH (*cacciare*, to pursue: *Ital.*), in Music, a piece for three or four voices, one of which leads, and the others follow in the same notes. But perhaps it may be more correctly described as a fugue in the unison, in which, to humour some conceit in the words, or to give them a different meaning, the melody is broken, and the sense is interrupted in one part, and *caught* and supported by another.

CAT'ECHISM (*katechismos*, from *katecheo*, I instruct: *Gr.*), a form of religious instruction conveyed in questions and answers. The catechism of the Church of England originally consisted of no more than a repetition of the baptismal vow, the creed, and the Lord's Prayer; but James I. ordered the bishops to add to it a short and plain explanation of the sacraments.

CAT'ECHIST (*katechistēs*, from same: *Gr.*), an officer in the primitive Christian church, whose business was to instruct the catechumens in the first principles of religion, and thus prepare them for the reception of baptism.

CAT'ECHU, an inspissated juice with astringent properties, employed in medicine, and obtained in India chiefly from an acacia. It consists chiefly of tannin.

CATECHU'MENS (*katechoumenoi*, from *katecheo*, I instruct: *Gr.*), a name formerly given in the Christian church to such as were prepared to receive the ordinance of baptism. They were anciently the children of believing parents, or pagans not fully instructed in the principles of the Christian religion; and were admitted to this state by the imposition of hands and the sign of the cross.

CATEGO'RICAL (see the next), in Logic, a proposition that makes an absolute statement, and without any hypothesis, is said to be categorical.

CAT'EGORY (*katagoreuo*, I give information of: *Gr.*), in Logic, a general term in reference to a less general, included under it. The school philosophers distributed all the objects of our thoughts and ideas into certain genera or classes, which classes the Greeks called *categories*, and the Latins *predicaments*. Aristotle made ten categories, viz. substance, quantity, quality, relation, action, passion, time, place, condition, and habit.

CATE'NA PA'TRUM (a chain of the fathers: *Lat*), in Ecclesiastical Literature, a book containing the sentiments of the ancient Christian fathers, with respect to doctrines; the separate passages being brought together so as to form one work.

CATENA'RIA, or CATE'NARY (*catenarius*, belonging to a chain: *Lat.*), in Geometry, the curve which a rope or chain suspended at each end forms by its own weight. It differs very little from a parabola.

CAT'ERPILLAR, in Entomology, the larva of lepidopterous insects, produced from the egg. It is transformed first into the chrysalis or nympha, and afterwards into the butterfly. Caterpillars generally feed on leaves or succulent vegetables, and are sometimes very destructive; they are composed of thirteen distinct segments, the first of which is a strong horny head, armed with a mouth and powerful jaws. The first three segments are invariably provided with short legs, and frequently some of the other segments have eggs

Caterpillars moult at least three times, and those of some species moult as many as ten times. Many caterpillars are gaily coloured; others are adorned with tufts of hair. In this state insects eat voraciously, and do immense damage to vegetation. When about to change into the pupa form, they retire to some place where they may remain undisturbed until the final metamorphosis. [See LEPIDOPTERA.]

CAT'GUT, the name for the strings made from the dried and twisted peritoneal coverings of the intestines of sheep and other animals. They are used for musical instruments, for lathe-bands, whips, bows, &c. Great quantities of catgut are imported from Lyons and Italy.

CATHAR'TICS (*kathartikos*, fit for purifying; from *kathairo*, I purify: *Gr.*), medicines which cleanse the stomach and bowels by acting as purgatives.

CATH'EDRA (*kathedra*, a seat: *Gr.*), in Archæology, a term used to denote the pulpit, or the professor's chair. It originally signified any chair.——Among Ecclesiastical writers it signifies a bishop's see or throne. Hence, *ex cathedrâ* is a phrase much used among the clergy of the Roman Catholic church, in relation to the solemn decrees of the pope.

CATHE'DRAL (same *deriv.*), the episcopal church, or a church where there is a bishop's seat or see.

CATH'ERINE-WHEEL (from the wheel on which St. Catherine of Alexandria is said to have been martyred), in Architecture, a large circular Gothic window. Also a firework constructed in the form of a wheel, which revolves when it is let off.

CATH'ETER (*kathetēr*, from *kathiēmi*, I send down: *Gr.*), in Surgery, a tubular instrument, usually made of silver, and introduced into the bladder, in order to search for a calculus, or draw off the urine when suppressed; also a bougie made of silver or caoutchouc.

CATH'ETUS (*kathetos*, a perpendicular; from same: *Gr.*), in Geometry, a line or radius falling perpendicularly on another line or surface; as the two sides of a right-angled triangle.——In Architecture, a perpendicular line, supposed to pass through the middle of a baluster, column, &c.——CATHETUS OF INCIDENCE, in Catoptrics, a right line drawn from a point of the object, perpendicular to the reflecting line.——CATHETUS OF OBLIQUATION, a right line drawn perpendicular to the speculum, in the point of incidence or reflection.——CATHETUS OF REFLECTION, or *of the eye*, a right line drawn from the eye, perpendicular to the reflecting line.

CATH'OLIC (*katholikos*, universal: *Gr.*), an epithet properly signifying universal. Originally this appellation was given to the Christian church in general.——CATHOLIC EMANCIPATION was the abolition of those civil and ecclesiastical restraints to which the Roman Catholics of Great Britain and Ireland were formerly subjected. The first step towards this took place in 1793, when an act of parliament was passed, which conferred upon them the elective franchise, and threw open to them all employments in the army, and all offices in the navy. In 1801, the legislative union of Great Britain and Ireland took place; but though full emancipation was said to have been promised as a consequence of this union, it was not conceded; and many unsuccessful attempts were afterwards made to obtain it. At length, in 1829 (April 10), a *relief bill*, abolishing the civil disabilities of Roman Catholics, by repealing the oaths of supremacy, &c., was carried by the Wellington administration. By this bill, they are eligible to all offices of state, excepting the lord-chancellorships of England and Ireland, the lord-lieutenancy of Ireland, the office of regent or guardian of the united kingdom, and that of high commissioner to the church of Scotland.——CATHOLIC MAJESTY, the title given to the king or queen of Spain.

CATHOL'ICON (same *deriv.*), a remedy for all diseases; a soft purgative electuary, so called, as being supposed a universal and efficacious purge of all humours

CAT'KIN (*katteken*: *Dut.*), in Botany, or *amentum*, a kind of inflorescence consisting of a spike of unisexual flowers, each with a protecting scale, the whole separating from the stem at an articulation. The male flowers of the willow and hazel are in catkins. The resemblance to a cat's tail suggested the name. The nat. order, AMENTACEÆ, is founded on the possession of male catkins.

CAT'ODON (*kata*, down; and *odous*, a tooth: *Gr.*), a genus of cetaceans, the characters of which are, that they have no teeth in the upper jaw, nor any fin on the back. It includes the SPERM WHALE, which see.

CATOP'SIS (a sight: *Gr.*), in Medicine, an acute and quick perception, particularly that acuteness of the faculties which accompanies the latter stages of consumption.

CATOP'TRICS (*kata*, against; and *optikos*, belonging to sight: *Gr.*), that part of optics which treats of reflected light, and of the images found by reflecting surfaces whether plane or curved.

CAU'DA (a tail: *Lat.*), in Astronomy, a term prefixed to the names of several constellations, to denote certain stars in their tails; as *cauda Capricorni*, *cauda Leonis*, &c.

CAU'DEX (*Lat.*), in Botany, the stem of a shrub.

CAUK, a name given by miners to certain specimens of the compact sulphate of barytes. The same word is sometimes applied to masses composed of concentric lamellar concretions.

CAUL (*kulle*: *Goth.*), in Anatomy, a membrane in the abdomen, covering the greatest part of the lower intestines, and usually furnished with a large quantity of fat. It is more properly termed the *omentum*, or, from its net-like structure, the *reticulum*.——The word CAUL is also used for a membrane which encompasses the head of many newborn children, to which vulgar superstition absurdly annexes the charm of preservation from drowning.

CAULES'CENT (*kaulos*, a stem: *Gr.*), in Botany, having a stem different from that which produces the flower.

CAULIF'EROUS (*kaulos*, a stem; and *phero*, I bear: *Gr.*), an epithet given to such plants as have a perfect caulis or stem.

CAU'LIFLOWER (*caulis*, a cabbage: *Lat.*), a much-esteemed species of *Brassica*, or cabbage.

CAU'LINE (from next), in Botany, growing immediately on the stem, without the intervention of branches; as a *cauline* leaf, bulb, peduncle, &c.

CAU'LIS (*Lat.*), in Botany, the stalk of herbaceous plants: this in shrubs is called the *caudex*; and in grasses the *culmus*, or stem.

CAUSAL'ITY or **CAUSA'TION** (*causa*, a cause: *Lat.*), among Metaphysicians, the action or power of a cause in producing its effect.

CAU'SALTY, among Miners, the light earthy parts of ore, carried off by washing.

CAUSE (*causa: Lat.*), that from which anything proceeds, or by virtue of which anything is done: it stands opposed to *effect*. That which produces is the *cause*; that which is produced, the *effect*. According to some, we derive the idea of cause and effect from experience: according to others, it is an innate idea independent of experience. Causes are distinguished, by the schools, into efficient, material, final, and formal.——EFFICIENT CAUSES are the agents employed in the production of anything. MATERIAL CAUSES, the subjects on which the agents work, or the materials of which the thing is produced. FINAL CAUSES are the motives inducing an agent to act, or the design and purpose for which the thing was done. FORMAL CAUSES are those which must supervene to matter, in order to give the thing its precise individual existence as that thing, and no other.——CAUSE, among civilians, is the same as *action*; denoting any legal process which a party institutes to obtain his demand, or by which he seeks his supposed right.

CAU'SEWAY, or **CAU'SEY** (*chaussée: Fr.*), a way raised above the natural level of the earth, by stones, stakes, clay, or fascines; serving either as a road in wet marshy places, or to prevent a river from overflowing the lower grounds. It is also very generally used for a raised way or path in any ordinary road.

CAUSTIC (*kaustikos*, corrosive; from *kaio*, I burn: *Gr.*), in Medicine, any substance that, being applied, it corrodes and destroys the texture of the parts. Caustics differ from cauteries in performing their effects more slowly, and with less force and pain.——CAUSTIC CURVE, in Geometry, a curve, to which the rays of light reflected or refracted by another curve are tangents.——LUNAR CAUSTIC, a preparation of nitrate of silver, obtained by fusing it and then casting it in cylindrical moulds.

CAU'TERY (*kauterios*, corrosive, from same: *Gr.*), in Surgery, a medicine for burning, eating away, or corroding any solid part of the body. The act of burning or searing some morbid part is termed *cauterization*.

CAVALCA'DE (*Fr.*; from *caballus*, a horse: *Lat.*), a pompous procession of horsemen, equipages, &c., by way of parade to grace a triumph, public entry, or the like.

CAV'ALIER (a horseman: *Fr.*, from same), a gallant armed horseman. It was also an appellation given to the partisans of Charles I. to distinguish them from the parliamentarians, who were called Roundheads.——In Fortification, a work raised within the body of a place, above the other works, to defilade them from the fire of an enemy on an adjacent height, or to command the trenches of the besiegers.

CAV'ALRY (*cavalerie: Fr.*), a body of soldiers on horseback; a general term for light-horse, dragoons, lancers, and all other troops who are armed and mounted. The chief use of cavalry is to make frequent excursions to disturb the enemy, and intercept his convoys; in battle to support and cover the infantry, and to break through and disorder the enemy; and its application to this purpose is probably almost as ancient as war itself. At the present day, the cavalry is divided into *light* and *heavy horse*, which are employed for different purposes. The heavy cavalry, sometimes equipped with defensive armour, and then termed cuirassiers, is generally used where force is requisite; the lighter, in small detachments where swiftness and continued effort are necessary.

CA'VEAT (let him take care: *Lat.*), an entry made in certain courts and offices, after which no proceedings are taken in the matter to which it relates, without notice to the person making the entry.

CA'VEAT EMP'TOR (let the buyer be on his guard: *Lat.*), a legal maxim, the meaning of which is that a man entering into a bargain is bound to exercise a proper amount of caution.

CAV'ERN (*caverna*, from *cavus*, hollow: *Lat.*), a natural cavity, or deep hollow place in the earth. Among the grandest natural caverns known is Fingal's cave, in Staffa, one of the western islands of Scotland. The grotto of Antiparos, in the Archipelago, is remarkable for its magnificence. In some parts of it, immense columns of stalactites descend to the floor; in others are the appearances of trees and brooks turned to marble. The Peak Cavern, in Derbyshire, is also a celebrated curiosity of this kind. It is nearly half a mile in length, and, at its lowest part, six hundred feet beneath the surface. In the Cevennes mountains, in France, are caverns and grottoes of great extent. But the largest known is the cavern of Guacharo, in South America, which is said to extend for leagues.

CAVET'TO (the *dim.* of *cavo*, hollow: *Ital.*), in Architecture, a hollow member, or round concave moulding, containing the quadrant of a circle, and used as an ornament in cornices.

CAV'EZON (*cavezzone: Ital.*), a sort of nose-band, either of iron, leather, or wood, sometimes flat, and at other times hollow or twisted. It is put on the nose of a horse, to wring it, and thus to forward his breaking and training.

CAVIA'RE (*caviar: Fr.*), the spawn or hard roes of sturgeon, which, being made into cakes, is salted and dried in the sun. It is much used in Russia, and other parts of the continent.

CAV'IN (*cavus*, hollow: *Lat.*), in Military affairs, a natural hollow, sufficiently capacious to lodge a body of troops, and facilitate their approach to a place.

CAV'OLINITE (*cavolino*, a cabbage : *Ital.*), a mineral, occurring in the interior of calcareous balls, &c.

CAYENN'E PEPPER. [See CAPSICUM.]

CAY'MAN, a species of alligator inhabiting Brazil, the *Caiman palpebrosus* of naturalists. It is less in size, and not so ferocious as the alligator. On the eyebrows are large bony knobs which give it a peculiar appearance.

CEDAR OF LEBANON, the *Cedrus Libani* of botanists (*kedros : Gr.*; from *heder*, to mourn : *Heb.*), is an evergreen coniferous tree, growing to a large size, and having a noble appearance. Its timber is very durable, but wanting in strength. Cedar wood in good preservation was found in the temple of Apollo at Utica, where it had been for 2,000 years. Solomon employed the wood in the building of the temple of Jerusalem. The cedars on Mount Lebanon in Syria are now much reduced in number, only about 400 being now remaining, and there are far more specimens of the tree in England, where it is much planted as an ornament on lawns, than on its native hill. The cedar of the Atlas mountains, and that of the Himalayas, though they have received distinct names from botanists, on account of differences in their habits, are suspected to belong to the same species as the Lebanon cedar.——The term *cedar* is popularly applied to various species of juniper and cypress. The cedar-wood used for pencils is obtained from *juniperus Bermudiana*, *J. Virginiana*, and other species. In North America, the *Thuja occidentalis* is called white cedar. The cedar of Goa is *Cupressus lusitanica*, a handsome tree, but too tender for our climate.

CE'DRAT (*Fr.*), a variety of the lime, from the fruit of which a perfume is obtained.

CEIL'ING (*ciel*, the heaven: *Fr.*), in Architecture, the upper part or roof of a room, being a layer or covering of plaster over laths, nailed on the bottom of the joists which bear the floor of the room next above, or on joists put up for that purpose where there is no upper room—hence called ceiling joists.

CEL'ESTINE (*cœlestis*, heavenly : *Lat.*), in Mineralogy, native sulphate of strontian; it receives its name from its occasionally being of a delicate blue colour.

CELES'TINS, a religious order, reformed from the Bernardins by Pope Celestin V. The Celestins rise two hours after midnight to say matins: they eat no flesh, except when sick, and fast often. Their habit is a white gown, a capuche, and a black scapulary.

CE'LIBACY (*cœlebs*, unmarried: *Lat.*), an unmarried or single state of life. Among the ancient Romans, men who remained unmarried were subjected to certain disabilities. In the early Christian church, the ministers of religion were not obliged to observe celibacy. An attempt was made at the council of Nice, in A.D. 325, to render it obligatory on the clergy, but without success; it was adopted, however, at that of Arles, in A.D. 340, and at the end of the sixth century its observance had become common; the council of Trent confirmed the obligation. In the Greek church, clerics under the degree of bishops are allowed to marry; and hence the higher dignities in that church are filled by monks.

CELL (*cella : Lat.*), in its first and obvious sense, a small, close apartment; in a less restricted sense, it denotes any small cavity or hollow place.—— In Physiology, cells are the vesicles or sacs of which animal and vegetable structures are composed, under various forms and modes of connection. The structure and development of cells occupy a large portion of the physiologist's attention, and the study can only be pursued with the assistance of the microscope.

CEL'LULAR TISSUE, a white fibrous tissue, generally diffused throughout the bodies of vertebrate animals. It fills up the spaces between the different organs, and forms part of most of them. It consists chiefly of gelatine.

CEL'LULOSE (same *deriv.*), the proximate principle composing the cell membrane of plants. Sulphuric acid readily dissolves it. It becomes blue when treated with iodine, and this is the ordinary test for it.

CEL'TIC (*Keltai*, the Celts : *Gr.*), a branch of the great Indo-European or Aryan family of languages. The Kymric and Gadhelic are the only remaining dialects. To the former belong the Welsh, Cornish, and Armorican (Brittany); to the latter, the Irish and Gaelic. The ancient Celts lived in Britain, Belgium, Gaul, Switzerland, Northern Italy, and Spain.

CEMENT', amongst builders, signifies a binding material which hardens quickly under water. It is made by calcining limestones, which contain from 40 to 60 per cent. of silicates, or it is prepared by calcining a mixture of slaked lime and blue clay. In the latter case, the cement is called artificial.

CEMENTA'TION, in Chemistry, the act of surrounding any substance with the powder of some other, and exposing them, in a close vessel, to a heat not sufficient to fuse them. The formation of steel from iron, by means of the application of charcoal, is effected in this way. Layers of bars of malleable iron and of charcoal being arranged one upon another, out of contact with the air, they are placed in a suitable furnace; the fire is then rendered very intense, and kept up for a certain time; after which the bars are allowed to cool gradually. The result is *blistered steel*, so called from the appearance of its surface. And this, broken in pieces, and melted, is *cast steel*.

CEM'ETERY (*koimētērion*, from *koimao*, I put to sleep: *Gr.*), a repository for the dead. Among modern improvements, perhaps few are more deserving of commendation than the custom, recently introduced, of appropriating an eligible spot of ground, at a convenient distance from populous towns, for the purpose of human interment.

CEN'OTAPH (*kenotaphion*: from *kenos*, empty; and *taphos*, a tomb: *Gr.*), in Antiquity, an empty tomb, erected in honour of the deceased, and differing from a sepulchre, in which the body was actually deposited.

CEN'SER (*encensoir: Fr.*), in the religious rites of the ancients, a vase containing the incense to be burned in sacrificing to the gods. Censers were likewise in use among the Jews as we find in 1 Kings vii. 50. Solomon, when he prepared furniture for the temple of the Lord, among other things made censers of pure gold. Censers are used in Roman Catholic churches.

CEN'SOR (*Lat.*, from *censeo*, I reckon), the name of two magistrates at ancient Rome. Their office was regarded as sacred, and higher than all others except the dictatorship; but they were not allowed lictors, the sign of imperial authority. They had an irresponsible control of a general nature over the conduct and morals of the citizens. It was part of their duty to keep a register of the citizens and their property, and they were concerned in the management of the finances of the state. The censorship existed from B.C. 443 to B.C. 22, a period of 421 years.

CEN'SURE (*censura*, a severe judgement: *Lat.*), a sentence which condemns some book, person, or action, or more particularly a reprimand from a superior.——ECCLESIASTICAL CENSURES, penalties by which, for some striking misconduct, a member of a church is deprived of its communion, or prohibited from executing the sacerdotal office.

CEN'SUS (*Lat.*, from *censeo*, I reckon), in Roman Antiquity, an authentic declaration made before the censors, by the several subjects of the empire, of their respective names and places of abode. This declaration was registered by the censors, and contained an enumeration of all their estates, lands, and inheritances — including their quantity and quality, with the wives, children, domestics, tenants, and slaves of each citizen. The census was held every five years. The word *Census* is still used to signify an enumeration of the inhabitants of any kingdom or state, taken by the government.

CENT, an abbreviation of the Latin word *centum*, a hundred, used in giving the ratio of anything with reference to that number. Thus a profit of ten per cent. means a profit on the capital employed at the rate of ten pounds in a hundred.

CEN'TAUR (*kentauros: from kenteo*, I goad; and *tauros*, a bull; *Gr.*), in Classic Antiquity a monster, half man and half horse. A savage race dwelling between Pelion and Ossa, in Thessaly, and extirpated in a war with the neighbouring Lapithæ. A favourite subject with ancient poets and sculptors; Ovid and others have described it, and Phidias represented it in marble. Hercules and Theseus were the leaders of the Lapithæ.

CEN'TAURY (*kentaurion: Gr.*), the English name of the genus *Centaurea*, which includes a large number of species of composite plants. It is said to have derived its name from Chiron the Centaur having cured himself with it, after wounding himself with one of the arrows of Hercules. The *Lesser Centaury* (*Erythræa*), is an English wild plant belonging to the Gentian order.

CEN'TIPEDE (*centipes:* from *centum*, a hundred; *pes*, a foot: *Lat.*), a name given to the species of the annulose genus *Scolopendra*, on account of their numerous feet.

CEN'TO (a garment made of patchwork: *Lat.*), in Poetry, a work wholly composed of verses or passages, taken from various authors, and disposed in a new order.

CEN'TRE, or CEN'TER (*centrum: Lat.*; from *kentron*, a point: *Gr.*), a point equally distant from certain other points in a line, figure, or body.——CENTRE OF GRAVITY, that point about which all the opposite points of a body exactly balance each other, in any situation.——CENTRE OF MOTION, the point which remains at rest, while all the other parts of a body move round it.

CENTRIF'UGAL FORCE (*centrum*, a centre; and *fugio*, I fly: *Lat.*), the tendency with which bodies, forced to move in a curve, endeavour to fly off in a tangent to its periphery. This property of matter has been taken advantage of to effect several useful purposes. Watt's pendulum governor is one of its applications. Centrifugal pumps of great power have been constructed, their principle being that as the water is thrown off above by the rapid revolution of arms, or a cylinder, a fresh supply of the liquid is forced upwards by the pressure of the atmosphere into the revolving parts. Centrifugal machines have also been invented for driving the moisture out of wet textile fabrics, and from concentrated cane syrup in the manufacture of sugar, the fabrics and sugar being made to revolve with great rapidity, whilst the moisture escapes through a close net-work of wire which forms the periphery of the revolving cylinder.

CENTRIP'ETAL FORCE (*centrum*, a centre; and *peto*, I go towards: *Lat.*), the tendency with which bodies move, or endeavour to move, towards the centre of a system of bodies. Such is gravity, or that force by which bodies tend towards the centre of the earth; and that by which the planets are continually drawn back from rectilinear motions, and made to move in curves.

CENTUM'VIRI (one hundred men: *Lat.*), in Roman Antiquity, judges appointed to decide common causes among the people. They formed a definite body or collegium.

CENTU'RION (*centurio*, from *centum*, a hundred: *Lat.*), among the Romans, an officer in the infantry, who commanded a century. This should, from its name, consist of a hundred men, but it rarely did so, as the legion was seldom complete. Two centuries constituted one *maniple;* three maniples, one *cohort;* and ten cohorts, one *legion*. The centurion of the first century of the first maniple of the *Triarians* presided over all the others; had charge of the eagle, or chief standard; and ranked with the knights. The badge of a centurion was a *vine rod*.

CEN'TURY (*centuria*, from same: *Lat.*), in a general sense, denotes a hundred, or anything divided into or consisting of a hundred parts. The Roman people, when they were assembled for the electing of magistrates, enacting of laws, or deliberating upon any public affair, were always divided into centuries, which were supposed to contain one hundred, though this was not necessarily the case; and voted by centuries, in order that their suffrages might be the more easily collected; whence these assemblies were called *comitia centuriata*. ——In Chronology, a *century* means the space of one hundred years, and this is the most common signification of the word. As we begin our ordinary computation of time from the incarnation of Christ, the word is generally applied to some term of a hundred years subsequent to it.

CEPH'ALIC (*kephalē*, the head: *Gr.*), an epithet for medicines which are good for the head-ache.

CE'PHALOPODS (*kephalē*, a head; and *pous*, a foot: *Gr.*), the highest class of molluscs, including the CUTTLE FISHES and the NAUTILUS. Around the head are placed a number of muscular arms, which, in several species, are of great length, and beset with sucking disks. The class is divided into two orders: 1. *Dibranchiata*, with two branchiæ, sessile eyes, and an internal shell; here are placed the sepia, poulp, octopus, CALAMARY, paper nautilus (the last having an external shell) and the animals of which the fossils known as belemnites have been the internal shells.—2. *Tetrabranchiata*, with four branchiæ, stalked eyes, and an external shell. Of 1400 extinct species there is only one living representative, the *nautilus pompilius*, which inhabits the Chinese seas and Indian Ocean.

CE'PHEUS (*Gr.*), in Astronomy, a constellation of the northern hemisphere.

CERA'MIC (*keramos*, potter's clay: *Gr.*), a term applied to articles formed of baked clay, such as pottery and fictile vases.

CER'ASIN (*kerasos*, a cherry-tree: *Gr.*), a gummy substance which swells in cold water, but does not readily dissolve in it.

CERAS'TES (*kerastēs*, a horned serpent; from *keras*, a horn: *Gr.*), in Zoology, a genus of venomous vipers, natives of Africa. The *C. nasicornis* has a very repulsive appearance, and carries a pair of horns on its snout.

CE'RATE (*ceratum*, from *cera*, wax: *Lat.*), in Medicine, a composition made of oil, wax, and other ingredients; used externally in several diseases, where plasters are necessary.

CERATI'TES (*keras*, a horn: *Gr.*), a genus of fossil nautili found in the muschelkalk of Europe.

CE'RATOGLOS'SUS (*keras*, a horn; and *glōssa*, the tongue: *Gr.*), in Anatomy, the name of a pair of muscles serving to draw the tongue directly into the mouth. If only one of them acts, it draws the tongue to one side of the mouth.

CERATO'IDES (*keras*, a horn; and *eidos*, appearance: *Gr.*), in Anatomy, a name for the *tunica cornea* of the eye.

CER'BERUS (*Gr.*), Pluto's three-headed dog, the issue of the serpent-woman Echidna, by the giant Typhon. He was placed at the entrance of hell, to keep living mortals from entering, and the dead from escaping. He was, however, appeased with cakes by those heroes who visited Pluto's realm when alive. Orpheus, in search of Eurydice, lulled him to sleep with his lyre. Hercules, going for Alceste, dragged him away.

CEREBEL'LUM (a *dim.* of *cerebrum*, the brain: *Lat.*), the part of the brain in the back of the skull, divided into two lobes; its removal, or injury, deprives the animal of the power of volition.

CER'EBRUM (the brain: *Lat.*), that part of the brain which occupies the front and top of the skull; its removal, or injury, deprives the animal of sensation. [See BRAIN.]

CER'EMONY (*cærimonia: Lat.*), an assemblage of several actions, forms, and circumstances, serving to render a thing more magnificent and solemn; particularly used to denote the external rites of religious worship, the formality of introducing ambassadors to audiences, &c.——MASTER OF THE CEREMONIES, an officer instituted by James I. for the more honourable reception of ambassadors and strangers of quality, and for the regulation of all matters of etiquette in the assemblies over which they preside.

CE'RES, a small planet, which revolves round the sun in four years, seven months, and ten days, at the distance of 250,000,000 of miles. It is only 160 miles in diameter.

CE'REUS, in Botany, a genus of Cactaceæ, including the torch thistle, night-blowing Cereus, and other plants with beautiful flowers.

CE'RIN (*kērinos*, waxen: *Gr.*), in Chemistry, one of the two proximate principles of bees'-wax, the other being myricin. They are separated by boiling alcohol, and are both white crystalline substances, which chemists consider compound ethers.

CERIN'THIANS, the followers of Cerinthus, one of the first heresiarchs in the church. They denied the divinity of Christ, but they held that a celestial virtue descended on him at his baptism in the form of a dove, by which he was consecrated and made Christ.

CE'RITE, the silicious oxide of *cerium*, a rare mineral, of a pale rose-red colour, with a tinge of yellow, found in Sweden.

CE'RIUM (from the planet *Ceres*), a metal, of a flesh-red colour, obtained from CERITE. It becomes friable from heat, but does not melt. Its equivalent is 47. It is of no known use. Cerium combines with several acids, and forms salts.

CERO'MA (*kerōma*, from *keros*, wax: *Gr.*), an ointment made of oil and wax, with which the ancient wrestlers rubbed themselves, to render their limbs more supple. ——Also, that apartment in the bath where the ointment was used.

CER'THIA (*kerthios: Gr.*), in Ornithology, the name of a genus of birds in the Passerine order, including the European *Certhia familiaris*, a very small bird, that ascends tree trunks, searching the crevices for insects.

CERTIF'ICATE (*certus*, certain; and *facio*, I make: *Lat.*), in a general sense, a testimony given in writing to declare or certify the truth of anything.

CERTIORA'RI (pas. infin. pres. of *certioro*, I give information: *Lat.*), a writ issuing out of some superior court, to call up the records of an inferior court, or remove a cause there depending, that it may be tried in the superior court.

CERU'MEN (*cera*, wax: *Lat.*), the wax, or viscid yellow liquid which collects in the ear, and hardens on exposure to the air.

CE'RUSE, CE'RUSS (*cerussa: Lat.*; from *razaz: Arab.*), or white lead, a carbonate of lead, usually made by exposing plates of that metal to the vapour of vinegar, assisted by the high temperature of fermenting tan. The vinegar vapour only acts as a carrier between the carbonic acid evolved by the fermenting tan and the oxide found under the influence of the acid vapour.

CER'VUS (a stag: *Lat.*), in Zoology, a genus of deer, including the red deer, the Wapiti deer, and other species. [See DEER.]

CER'VUS VO'LANS (the flying stag: *Lat.*). [See STAG BEETLE.] The French apply the name *Cerf-Volant* both to this beetle and to a boy's kite.

CESSA'TION OF ARMS, an armistice, or occasional truce, agreed to by the commanders of armies, to give time for a capitulation, or for other purposes.

CESSA'VIT (he has ceased: *Lat.*), in Law, a writ formerly used to recover lands, when the tenant or occupier had *ceased* for two years to perform the service which constituted the condition of his tenure, and had not sufficient goods or chattels to be distrained.

CES'SION (*cessio: Lat.*), in a general sense, a surrender; but particularly a surrender of conquered territory to its former proprietor or sovereign by treaty.——CESSION, in the Civil Law, is a voluntary surrender of a person's effects to his creditors, to avoid imprisonment.——In the Ecclesiastical Law, when an ecclesiastical person is created a bishop, or when a parson of a parish takes another benefice without dispensation, their first benefices become void by cession, without resignation.

CES'TUS (*kestos*, embroidered; from *kenteo*, I prick: *Gr.*), a girdle said to be worn by Venus, to which Homer ascribes the power of exciting love towards the wearer. It was also a marriage girdle, richly studded, with which the husband girded his wife at the wedding, and afterwards loosed.

CE'TACEA (*cetos*, a whale: *Gr.*), an order of mammals living in water, and having more or less the appearance of fishes, from which, however, they are broadly distinguished by having warm blood, which is oxygenated by means of lungs, not gills; and by bringing forth living young, which are nourished with milk secreted by the mother. The windpipe opens at the top of the head by one or two blow-holes, through which the water taken into the mouth is ejected. There are six families:—1. *Balænidæ*, true WHALES. 2. *Catodontidæ*, or *Physeteridæ*, or SPERM WHALES. 3. *Delphinidæ*, DOLPHINS. 4. *Manatidæ*, MANATEES. 5. *Halichoridæ*, DUGONGS. 6. *Rhytinidæ*.

CE'TUS (the whale: *Lat.*), in Astronomy, the *Whale*, a large constellation of the southern hemisphere, containing 97 stars.

CHABA'SITE, in Mineralogy, a precious stone, white, and sometimes transparent: a kind of *zeolite*.

CHA'FERY (*chauffer*, to warm: *Fr.*), a forge in an iron mill, where the iron is hammered into bars, and finished.

CHA'FE-WAX (same *deriv.*), an officer of the court of chancery, who prepares the wax for sealing writs, &c.

CHAF'FINCH, the English name of the *Fringilla cœlebs*, a well-known bird, with an iron-coloured breast, and black wings spotted with white.

CHAIN (*chaine: Fr.*), a series of connected rings or links fitted into one another. Chains are made of various metals, and their different sizes and forms are suited to different purposes.——In Nautical language, CHAINS are strong links or plates of iron, the lower ends of which are bolted through a ship's sides to the timbers.——CHAIN-BOAT, a large boat adapted for getting up mooring chains, anchors, &c.——A CHAIN-PUMP consists of a long chain fitted with a sufficient number of plates, that are moved through a tube, and over two wheels, one above the other, by a long winch, on which several men may be employed at the same time.——CHAIN-SHOT, two half-balls of metal connected by a chain: they are used at sea for cutting the shrouds and rigging of a ship.——CHAIN-WALES, of a ship, are broad and thick planks projecting from a ship's side, abreast of and behind the masts.——CHAIN-WORK, work consisting of threads, cords, and the like, linked together in the form of a chain, as tambour or net-work, &c.——A SURVEYING CHAIN is a measure of length, made of a certain number of links of iron wire, serving to measure land, &c. Gunter's chain consists of a hundred such links, each 7·92 inches in length, and consequently, it is equal to 66 feet or 4 poles.——A TOP-CHAIN, on board a ship, is a chain to sling the sail-yards, to prevent their falling, when the ropes that support them are shot away.

CHAIR (*chaise: Fr.*), anciently the *suggestum*, or pulpit, whence the priest or public orator spoke to the people. [See CATHEDRA.] The word is still applied to the place whence professors in universities deliver their lectures; thus we say the professor's chair. It is commonly used with reference to the speaker or president of a public council or assembly, as the *speaker's chair*; and, by a metonymy, means the speaker himself, as to address the *chair*.——CURULE CHAIR, in Roman Antiquity, an ivory seat appointed to be used by the chief magistrates of Rome, and those to whom the honour of a triumph was granted.——CHAIR, in railway engineering, is the iron box into which the rails are wedged at intervals, and by means of which they are secured to the sleepers.

CHALA'ZA (hail: *Gr.*), among Naturalists, the white knotty string at each end of an egg, which connects the yolk and white together.——In Medicine, a disorder in the eyelids, well known by the name of a *stye*.——In Botany, the organic base of the nucleus of seeds, indicating the cotyledonary extremity of the embryo.

CHAL'CEDONY, or CAL'CEDONY (from

Chalcedon, where it was originally found), in Mineralogy, the name given to some forms of quartz which agree in being in uncrystallized masses, which have frequently a botryoidal, reniform, or nodular shape. It is of many colours, is usually semi-transparent, and is found all over the world. It occurs in small veins, or in cavities of other minerals, and appears to have been formed by the infiltration of silicious matter. HELIOTROPE, ONYX, SARD, and SARDONYX, are considered varieties of Chalcedony, and JASPER is nearly allied.

CHAL'CEDONYX (*chalcedony*, and *onyx*), a variety of agate, in which white and grey layers alternate.

CHAL'CITE, sulphate of iron, of a red colour, so far calcined as to have lost a considerable part of its acid.

CHALDEE', or CHALDA'IC, the *language* spoken by the Chaldeans, or people of Chaldea: it is a dialect of the Hebrew.

CHAL'ICE (*calix*: *Lat.*; from *kulix*: *Gr.*), the communion cup, or vessel used to administer the wine, in the sacrament of the eucharist.

CHALI'ZA (a disengaging: *Heb.*), in Hebrew Antiquity, the ceremony by which a woman, left a widow, pulled off the shoes of a brother-in-law, who should have espoused her; after which she was at liberty to marry whom she pleased.

CHALK (*calx*, limestone: *Lat.*), a well-known calcareous earth of an opaque white colour, called in pharmacy *creta* and *terra creta*. It forms immense deposits of the secondary period of geologists. [CRETACEOUS SYSTEM.] It consists of carbonate of lime, and the whole of it consists of animal remains in a more or less minute state of division. England is thought to derive its name *Albion* (*albus*, white) from its chalk cliffs.——BLACK CHALK, a kind of ochreous earth, of a close structure and fine black colour, used in drawing.——RED CHALK, an indurated clayey ochre employed by painters and artificers.

CHAL'LENGE, in a general sense, a summons to fight, whether in a duel or in a pugilistic contest.——In Law, an exception to jurors, made by one who is put on his trial: or the claim of a party that certain jurors shall not sit in trial upon his cause. The right of challenge is given both in civil and criminal cases, and extends either to the whole panel, or only to particular jurors. In criminal cases, a prisoner may challenge twenty jurors, without assigning a cause; which is called a *peremptory* challenge.

CHALY'BEATE (*chalybeius*, belonging to steel: *Lat.*; from *chalups*, steel: *Gr.*), an epithet for waters in which iron forms the principal ingredient, as those of Tunbridge Wells. Chalybeates act chiefly as absorbents and deobstruents.

CHAM, or KHAM, the title of the sovereign prince of Tartary. It is likewise applied to the principal noblemen of Persia.

CHA'MA (*Lat.*; from *chēmē*, a gaping: *Gr.*), a genus of marine conchiferous molluscs, the species of which are attached by one of the valves to rocks and stones. They are abundant in tropical seas, especially amongst coral reefs.

CHAMA'DE (a parley: *Fr.*), in War, a signal made by beat of drum or sound of trumpet, for a conference with the enemy, either to invite to a truce, or to propose a capitulation.

CHAM'BER (*chambre*: *Fr.*), in Polity, the place where certain assemblies are held; also the assemblies themselves. Of these some are established for the administration of justice, others for commercial affairs. In many languages, *chamber* is used to designate a branch of government whose members assemble in a common apartment. ——CHAMBER, in Gunnery, that part of a mortar or cannon which contains the powder when it is loaded.——CHAMBER OF A LOCK, the space between the gates of a canal lock, in which the barge rises and sinks, so as to pass to a different level.——CHAMBER OF A MINE, a place, generally of a cubical form, where the powder is confined.——POWDER-CHAMBER, a place underground for holding powder, &c., that it may be secure from the rain, &c.——PRIVY-CHAMBER. Gentlemen of the privy-chamber are servants of the sovereign, who are to wait and attend at court.

CHAM'BERLAIN (*chambellan*: *Fr.*), in a general sense, a person who has the management and direction of a chamber, or chambers.——LORD GREAT CHAMBERLAIN of England, not of the household, the sixth great officer of state, to whom belong various duties on the coronation day, and to whom also appertain many privileges—such as serving the sovereign with water before and after dinner, and having the basin and towels for his reward. The office was made hereditary by Henry I., in the family of De Vere, Earl of Oxford.——CHAMBERLAIN OF THE HOUSEHOLD, one of the three great officers of the royal household. He has the control of all the officers above stairs, except those within the precinct of the sovereign's bedchamber, which is under the government of the *Groom of the Stole*. In virtue of his situation, he precedes dukes. The emblem of the office of chamberlain, in European courts, is a gold key, generally worn suspended from two gold buttons.——CHAMBERLAIN OF LONDON, an officer of the corporation, who keeps the city money, presides over the affairs of citizens and their apprentices, and presents the freedom of the city to those who have faithfully served their apprenticeships.

CHAM'BERS, rooms or apartments belonging to the inns of court.——In Anatomy, two spaces between the crystalline lens and the cornea of the eye, divided by the iris.

CHAM'BRE AR'DENTE (burning chamber: *Fr.*), a chamber hung with black cloth, in which state prisoners in France, if of high rank, were tried by torchlight. When Francis II., in the 16th century, established a court to try the Protestants, who were usually condemned to be burned, the people called this court by the same name, in allusion to its awful sentences.

CHAME'LEONS (*chamaileōn*, literally the earth-lion: from *chamai*, on the earth; and *leōn*, a lion: *Gr.*), reptiles of the lizard order, forming the family of *chamælionidæ*, and distinguished from the other members of the order by having a long prehensile tail, a long slender protrusile tongue, and the toes arranged in two groups, three pointing forwards and two backwards, forming an apparatus for grasping. Their lungs are capable of great extension. The common chameleon (*C. vulgaris*), an animal about 12 inches long, including the tail, is a native of Asia, Africa, and the south of Spain. Tradition has assigned fabulous properties to it. The change of colour for which it is remarkable is supposed to arise from the *rete mucosum*, containing two differently coloured layers, the interior movable, and therefore capable of modifying the exterior. The chameleon is exceedingly slow, dull, and almost torpid. Its long tongue is covered at the extremity with a viscid mucus, and is darted out for the purpose of capturing the insects upon which it subsists. Its eyes are capable of being moved independently of each other.

CHAM'OIS (*Fr.*), the *Rupicapra tragus* of naturalists, a species of antelope, approaching the goats in structure. It lives on the Alpine ranges of Europe and Western Asia. It is very agile, and of difficult access, so that only the most daring sportsmen can succeed in killing it with their rifles. It is about three feet in length, and two in height. Its head resembles that of the common goat, but it has no beard. Its skin is made into soft leather, called *shammy*.

CHAM'OMILE (*chamaimēlon*, literally earth-apple: from *chamai*, on the earth; and *mēlon*, an apple: *Gr.*), a plant belonging to the order of *Compositæ*, well known for its medicinal virtues.

CHAMPA'GNE, a fine brisk kind of wine, so called from the district in France where it is produced.

CHAM'PERTY (*champ*, a field; and *parti*, divided: *Fr.*), in Law, an illegal bargain made with either plaintiff or defendant in any suit, for giving part of the land, debt, &c., sued for, to the party who undertakes the process at his own expense.

CHAM'PION (*campione*, from *campo*, a field: *Ital.*), a person who undertakes a combat in the place of another; sometimes the word is used for him who fights in his own cause. In ancient times, when two champions were chosen to maintain a cause, it was always required that there should be a decree of the judge to authorize the combat. When the judge had pronounced sentence, the accused threw down a gage or pledge, originally a glove or gauntlet, which being lifted up by the accuser, they were both taken into safe custody till the day appointed for battle. Before the champions took the field, their heads were shaved to a kind of crown, which was left at the top: they then made oath that they believed the persons who retained them to be in the right, &c. They always presented an offering to the church, that God might assist them in the battle.—CHAMPION OF THE KING, an officer who rides armed into Westminster Hall on the coronation day, while the sovereign is at dinner, and by herald makes proclamation, 'That if any man shall deny the king's (or queen's) title to the crown, he is there ready to defend it in single combat.' The sovereign drinks to him, and afterwards presents him with the cup for his fee. The manor of Scrivelsby in Lincolnshire is held by the tenure of fulfilling the duties of the sovereign's champion, and the championship is annexed to the manor, so that whoever is its owner has the privilege of acting as the royal champion. This arose by express grant to a Marmion by the Conqueror. The manor passed by a female heir to the Dymoke family in which it is still vested. At George IV.'s coronation one of this family appeared as the king's champion. Since then there has been no coronation banquet.

CHAN'CEL. The choir of a church is called chancel from the *cancelli* (*Lat.*), the screen or lattice-work partition dividing it from the body of the church, but not intercepting the sight.

CHAN'CELLOR (*cancellarius*: *Lat.*), under the Roman emperors, a chief notary or scribe; but in England an officer invested with high judicial powers. The Lord High Chancellor of Great Britain is one of the principal officers of the civil government, created without writ or patent, by the mere delivery of the king's great seal into his custody. He has precedence next after the Archbishop of Canterbury, who comes next after the royal family. He is a privy-councillor by his office, and prolocutor of the House of Lords by prescription. He appoints all the justices of the peace throughout the kingdom. Persons exercising this office in former times having been ecclesiastics, and superintendents of the royal chapel, the Lord Chancellor is styled *keeper of the king's conscience*; and for the same reason he is visitor, in right of the king, of all hospitals and colleges of the king's foundation, and is patron of all the king's livings rated under the value of 20*l.* per annum in the king's books. He is the general guardian of all infants, idiots, and lunatics; has a control over all public charities, and a jurisdiction of vast extent, as the head of the law, in his court of chancery; but there is an appeal from his decision to the House of Lords.—CHANCELLOR OF A CATHEDRAL, an officer who hears lessons read in the church, inspects schools, hears causes, writes letters, applies the seal of the chapter, keeps the books, &c. —CHANCELLOR OF A DIOCESE, a lay officer under a bishop, versed in the canon and civil law, and judge of his court.—CHANCELLOR OF A UNIVERSITY, an officer who seals the diplomas, or letters of degree, &c. The chancellors of Oxford and Cambridge are generally selected from among the prime nobility or highest personages in the country, and hold office for life. Their duties are generally performed by vice-chancellors.—CHANCELLOR OF THE DUCHY OF LANCASTER, an officer appointed chiefly to determine controversies between the king and his tenants of the duchy land, and otherwise to direct all the king's affairs referable to his court. The holder of the office is a member of the cabinet.—CHANCELLOR OF THE EXCHEQUER, an officer who holds the highest place in that court, and takes care of the interests of the crown. He is always a member of the House of Commons, and has a seat in the cabinet. The financial measures of the government are in his charge. He has power, with the lord-treasurer, to lease the crown lands, and with others to compound for forfeiture of lands, on penal statutes; he has also great authority in managing the royal revenues, and in all matters relating to the finances of the state.——CHANCELLOR OF THE ORDER OF THE GARTER, and other military orders, an officer who seals the commissions and mandates of the chapter and assembly of the knights, keeps the register of their proceedings, and delivers their acts under the seal of their order.

CHAN'CE-MEDLEY (a corruption of *chaude mêlée*, an eager conflict: *Fr.*), in Law, the accidental killing of a person, not altogether without blame, though without any evil intention.

CHAN'CERY. According to Lord Coke, the name is derived from *Cancellarius*, the judge of the court, who is so styled *a cancellando*, because part of his duty is to cancel the royal letters patent when wrongly granted. In this court are two tribunals: the legal, or common law court, and the court of equity. The former has jurisdiction in *scire facias*, to repeal letters patent, and out of it issue all original writs which pass under the great seal, all commissions of uses, sewers, idiotcy, lunacy, &c. The equity side of the court is that great court of equity and conscience, whose object is to moderate the rigour of the other courts that are bound by the strict letter of the law. In this court, also, is administered relief which the common law courts are unable to give, or in which the relief given by them is inadequate, as in cases of contracts, for instance, when the courts of law can only give damages for the breach of them, the court of chancery will enforce specific performance. So, also, the latter court will grant injunctions to restrain wrongful acts, while the courts of common law, for the most part, can only give damages for the injury done by the wrongful act when committed. The court of chancery has also larger powers than are possessed by other courts, of causing the defendant to make discovery of matters known only to him, and which may be material to the plaintiff's case. Cases of trust and mortgage are cognizable only in the court of chancery, so also, practically speaking, are the administration of the assets of deceased persons, cases of partnership, accounts, &c. The judges of this court, as now constituted, are the lord-chancellor, the master of the rolls, two lords justices of appeal, and three vice-chancellors. The decisions of the master of the rolls and the vice-chancellors may be reviewed either by the lord-chancellor or by the court of appeal in chancery, which is a court composed of the lord-chancellor, and both or either of the lords justices, or of the lords justices sitting by themselves. From the decisions of the lord-chancellor, or of the court of appeal, there is an appeal to the House of Lords.

CHAN'CES, DOCTRINE OF, a branch of Mathematics, which estimates ratios of probability.

CHAN'GEABLE ROSE, the *Hibiscus mutabilis* of Linnæus, or *Martinico Rose*. Its flowers are white at their first opening; they then change to a blush-rose colour.

CHAN'GES, in Mathematics, the permutations or variations which any number of things may undergo, in regard to position or order, &c.; as, the different ways letters may be transposed, the changes that may be rung on a given number of bells, &c.

CHAN'NEL (*canalis*, a canal: *Lat.*), the deeper part of a strait, bay, or harbour, where the principal current flows, either of tide or fresh water, or which is most convenient for the track of a ship.——Also, a narrow sea between two continents, or a continent and an island; as the British, or Irish *channel*.

CHAN'SONS, or CHAN'ZOS, the amatory poems of the Provençals. They usually consisted of five stanzas and an envoy.

CHAN'TRY (*canto*, I sing: *Lat.*), a place in which to say mass for souls, or sing in divine worship.

CHA'OS (*Gr.*), that confusion in which matter is supposed to have existed before the world was produced by the creative power of Omnipotence; or, in other words, the unformed primeval matter of which everything was made.

CHAP'EAU (*Fr.*), in Heraldry, an ancient cap of dignity worn by dukes, made of scarlet velvet and lined with fur.

CHAP'EL (*chapelle: Fr.*), a place of divine worship, served by an incumbent under the denomination of a chaplain. There are various kinds of chapels; as *parochial chapels*, distinct from the mother church; *chapels of ease*, built in large parishes for the accommodation of the inhabitants; *free chapels*, which were founded by different kings; *chapels* belonging to particular *colleges; domestic chapels*, erected by noblemen or gentlemen for the use of their families; and dissenting meeting-houses, which are sometimes denominated *chapels*.

CHAP'ELRY (*chapellerie: Fr.*), the precinct belonging to a chapel, in distinction from a parish, or that belonging to a church.

CHAP'LAIN (*chapelain: Fr.*), an ecclesiastic who performs divine service in a chapel; but it more commonly means one who attends upon a king, prince, or other person of quality, for the performance of clerical duties in the private chapel.

CHAP'LET (*chapelet: Fr.*), in a general sense, a garland or wreath to be worn on the head.——In Architecture, a small moulding, carved into beads, pearls, &c.——CHAPLET, a string of beads used by the Roman Catholics, for counting their prayers, called *paternosters* and *ave-marias*. This practice is believed to have been introduced by St. Dominick. The chaplet is used also by Mahometans at their devotions; but their beads are all of the same size, and are not divided into *decades*. They have a smaller and a larger chaplet: the smaller contains 60 beads, and the larger 100 divided into three parts. Other orientals make use of chaplets, termed *chains*, consisting either of beads or links.

CHAP'TER (*chapitre: Fr.*), in Ecclesiastical polity, an assembly for the transaction of such business as comes within its cognizance. Every cathedral is under the superintendence of its dean and *chapter*. A meeting of the members of an order of knighthood is also called a *chapter*.

CHA'RACTER (*charaktēr*, from *charasso*, I mark: *Gr.*), in its most obvious sense, denotes a mark or sign made by writing, engraving, &c. Characters are *literal*, as the letters of an alphabet; *numeral*, as the arithmetical figures; and *emblematical*, when they represent things or ideas.

CHARA'DE (*Fr.*), a riddle, said to be named from its inventor; and made upon a word the syllables of which, when separately taken, are themselves words. It consists of two parts — the first describing the syllables separately, the second alluding to the entire word; and it may be considered complete if the whole unites in an epigrammatic point.

CHAR'COAL, an artificial fuel, consisting of wood deprived of its volatile constituents. It is usually prepared in the following manner: the wood is cut into proper lengths, and duly arranged in piles or stacks; and these being coated over with turf, and the surface covered with plaster made of earth and charcoal-dust well tempered together, to exclude the air almost entirely, and prevent waste by combustion, are set on fire. In two or three days, when the wood is known to be sufficiently charred, the apertures, which had been left to give vent to the flames, are closed up; and, all access of the external air being excluded, the fire goes out of itself. The vapour of burning charcoal is highly noxious: it is *carbonic acid*, and is found to possess many remarkable properties. Charcoal is black, brittle, light, and inodorous, and resists decay for an indefinite period. That made from a dense wood has the curious property of condensing gases and vapours in its pores. The greatest part of charcoal consists of the element carbon.——**ANIMAL CHARCOAL**, or charred bones, is extensively employed as a filter, in the purification of saccharine juices.

CHARGE (*Fr.*), in a general sense, that which is enjoined, committed, intrusted, or delivered to another, implying care, custody, superintendence, or fulfilment of duty on his part.——**CHARGE**, in Law, the instructions given by the judge to a jury.——In Ecclesiastical Law, the instructions given by a bishop to the clergy of his diocese.——In Electricity, the accumulation of electric matter on the coatings of electric jars.——In Gunnery, the quantity of powder and ball, or shot, with which a gun is loaded.——In Heraldry, whatever is borne on coats of arms.——In Military affairs, a signal to attack; as to sound the *charge*. Or the attack itself, which consists in rushing on an enemy with fixed bayonets, &c.; and the word is used for an onset of cavalry as well as of infantry.

CHA'RIOT (*carrhod: Wel.*), in Antiquity, a car or vehicle used formerly in war, and called by the several names of *biga*, *triga*, *quadriga*, &c., according to the number of horses which drew it. When the warriors came to an encounter in close fight, they alighted and fought on foot; but as soon as they were weary they retired into their chariots, and thence annoyed their enemies with darts and missive weapons. We find also frequent mention of *currus falcati*, or chariots armed with hooks or scythes, with which whole ranks of soldiers were cut down together: they were used not only by the Persians, Syrians, Egyptians, &c., but even by our British ancestors. The Roman *triumphal chariot*, generally made of ivory, was of a cylindrical figure, sometimes gilt at the top and ornamented with crowns; and, to represent a victory more naturally, it was even stained with blood. It was usually drawn by four white horses, but often by lions, elephants, tigers, bears, leopards, &c.

CHAR'LATAN (*Fr.*), one who makes unwarrantable pretensions to skill, and talks much in his own favour. The word originally meant an empiric, or quack, who retailed his medicines on a public stage, and drew the people about him by his buffooneries.

CHARLES'S WAIN, in Astronomy, seven stars in the constellation called *Ursa Major*, or the Great Bear.

CHAR'LOCK, the English name of a plant called by botanists *Raphanus Raphanistrum*, nat. ord. *Cruciferæ*. It is a weed very pernicious among grain.

CHARM (*carmen*, a verse: *Lat.*), magical words, characters, verses, &c., imagined to possess some occult and unintelligible power; by which some have pretended to do wonderful things.

CHART (*charta*: *Lat.*; from *chartēs*, a leaf of paper: *Gr.*), a hydrographical map, drawn for the use of navigators, and showing the situation of coasts, rocks, sand-banks, and sea-marks; also the course of currents, the depth of soundings, and the direction of regular winds.——**GLOBULAR CHART**, a meridional projection, in which the distance of the eye from the plane of the meridian, upon which the projection is made, is supposed to be equal to the sine of an angle of 45 degrees.——**HELIOGRAPHIC CHARTS** (*helios*, the sun; and *grapho*, I write: *Gr.*), representations of the sun, and of the maculæ or spots observed on its disk.——**MERCATOR'S CHART**, one on which the meridians are straight lines, parallel and equidistant; the parallels are also straight lines, but the distance between them increases from the equator towards either pole, so as to bear always the same ratio to the degrees of longitude which they do on the sphere itself.——**SELENOGRAPHIC CHARTS** (*selēnē*, the moon; and *grapho*, I write: *Gr.*), representations of the moon.

CHAR'TER (same *deriv.*), in Law, a written instrument, executed with certain forms, by which the sovereign bestows privileges on towns, corporations, &c. Magna Charta is the name applied to the Great Charter of Liberties granted to the people of the whole realm by King John.

CHAR'TER-PARTY (*parti*, divided: *Fr.*)

in Commerce, an agreement respecting the hire of a vessel and the freight.

CHAR'TISTS, a political party in England, composed chiefly of the working classes, who have embodied their principles in a document called the 'People's Charter,' the leading points of which are universal suffrage, vote by ballot, annual parliaments, electoral districts, abolition of property qualification, and payment of members of parliament.

CHAR'TULARY. [See CARTULARY.]

CHARYB'DIS (*Charubdis: Gr.*), a vortex at the entrance of the Sicilian straits, which was much dreaded by the ancients.

CHASE (*chasse: Fr.*), in Law, a franchise, anciently granted by the crown to a subject, empowering him to keep wild animals for his diversion, within a certain precinct; but not authorizing the establishment of forest law within it.——CHASE-GUNS, in Maritime language, those used to fire on a vessel that is pursued, in contradistinction to *stern-chasers*, which fire on the pursuer.

CHA'SING (*chasser*, to drive out: *Fr.*), in Sculpture, the art of embossing, or representing figures on metals by a kind of *basso rilievo*, punched out from behind, and carved on the front with small gravers.

CHAS'SEURS (*Fr.*), a term for a select body of infantry, formed on the left of a battalion, and required to be particularly light, active, and courageous.——CHASSEURS À CHEVAL, a kind of light horse in the French service.

CHAT'EAU, a French word formerly used for a castle or baronial seat in France, but now simply for a country residence. *Chateaux en Espagne* (*Fr.*, literally castles in Spain), castles in the air.

CHATOY'ANT (*chatoyer*, to sparkle: *Fr.*), in Mineralogy, a hard semi-transparent stone, generally very small, which, when cut smooth, reflects an undulating or wavy light, and is of a yellowish grey or green colour.——The word CHATOYANT is also used to express a changing undulating lustre, like that of a cat's eye in the dark.

CHAT'TELS (*catalla: Lat.*), in Law, a term applied not only to movable goods but also to such things as rents issuing out of land.

CHECK'-MATE (*échecs*, chess: *Fr.*), the termination of a game of chess, when the adversary's king is in such a position that although it is threatened with capture at the next move it cannot escape.

CHECK'Y (same *deriv.*), in Heraldry, a term for the shield, or any part of it, when it is divided into checks or squares.

CHEEKS, a general name among mechanics for those pieces of timber, &c., in any machine which form corresponding sides, or which are double and alike.

CHEESE (*caseus: Lat.*), the curd of milk coagulated by rennet, and separated from the whey, then pressed or hardened in a vat, hoop, or mould.——CHEESE-PRESS, a machine for pressing curd in the making of cheese.——CHEESE-VAT, the case in which curds are pressed into the form of a cheese.

CHEF-D'ŒUVRE (principal work: *Fr.*), a masterpiece, or best performance of any artist.

CHE'GOE, or JIGGER (*Ind.*), a species of flea, the *Pulex penetrans* of naturalists, which in warm countries bores into the human foot and lays its eggs, which as they increase in size cause painful irritation and inflammation if not extracted.

CHEE'TAH, or Hunting Leopard, the *Felis jubata* of naturalists. It is a native of both Asia and Africa. In India it is trained to hunt antelopes. It stands rather higher than the leopard, with the same length.

CHEIROP'TERA (*cheir*, the hand: *pteron*, a wing: *Gr.*), the scientific name for the family of bats. [See BAT.]

CHELO'NIA (*chelone*, a tortoise: *Gr.*), an order of shielded reptiles, comprising the turtles and tortoises, which have horny jaws, something like a bill, destitute of teeth. Bony plates above and below form a sort of box, which has holes through which project the head, tail, and legs. More than 130 species have been discovered, divided into five families:—1. *Testudinidæ*, land tortoises feeding on vegetables. 2. *Emydidæ*. 3. *Chelydidæ*. The species of both these families inhabit ponds of fresh water, and feed on an animal diet. 4. *Trionycidæ*, inhabiting rivers, and feeding on both animals and vegetables. 5. *Chelonidæ*, the true turtles, dwelling in the warmer seas: some species feed on marine plants; others on mollusca.

CHEM'ISTRY, or CHYM'ISTRY, the science which investigates the intimate nature of bodies, their composition and properties, together with the changes they undergo. As an art, it is very ancient; as a science, it may be considered to have had its origin in the beginning of the 17th century. The alchemists were the first who cultivated it, expecting to find a means for the transmutation of metals into gold, and a universal remedy for disease. They, of course, failed in these objects; but we owe to them many important discoveries, and the invention of much of the chemical apparatus still in use. To chemistry, more or less scientifically pursued, numerous arts owe their birth and progress; and to it also, the physiologist must resort for the explanation of phenomena that, without its aid, can only be spoken of by conjecture, although on a correct knowledge of them our health and happiness eminently depend. To facilitate the study of this important science, it is considered from different points of view, and thrown into divisions and subdivisions. It includes all that relates to chemical affinity, and the circumstances by which it is modified. It also considers the effects of light, heat, and electricity; the nature of simple and compound bodies, and the laws of their combination. The chemist distinguishes bodies into simple and compound substances. *Simple substances* comprehend such as have not hitherto been decomposed. *Compound substances* are formed by the union of simple or compound substances with each other. Chemical union is not simply a mixture of the components, such as would take place if we were to shake together a quantity of white and black sand. An entirely new substance is formed with properties quite different from any of the constituents. When the constituent parts of bodies are separated from each other, the bodies are said to be decomposed, and the act of separating them is called *decomposition*; on the other hand, when bodies are so intimately united as to form new and distinct substances, their union is distinguished by the name of *combination*. The chemical investigation of bodies, therefore, proceeds in two ways: by *analysis*, the separation of bodies by a series of decompositions, that we may arrive at the knowledge of their constituent parts; and by *synthesis*, a series of processes giving rise to new compounds; and these two forms of investigation may accompany and assist each other. Chemical combinations take place in definite proportions, the ratio of the elements being constant; and when a body is capable of uniting in several proportions with another, these proportions bear a simple numerical relation to each other. It has, moreover, been found, that if a body A unites with other bodies X Y Z, the quantity of any of the latter which unites with A will represent the quantity of it which will unite with the others, in case any union takes place. Lastly, the combining quantity of a compound is represented by the sum of the combining quantities of its components. Upon these laws, which have been ascertained by experiment, have been founded the equivalents of simple and compound bodies, that is, the numbers which represent the relations in which they unite one with another to form compounds. [See EQUIVALENT.] When gases combine, the combination between equal volumes, or between volumes which bear a simple relation to each other, it generally happens that a body unites with another in more than one proportion; thus, oxygen unites with nitrogen in five different proportions, and in one compound there is five times as much oxygen as in another. Each of these compounds has different properties from the others. What is very singular is, that the same constituents combined in the same proportions sometimes form compounds of different properties. [See ISOMERIC.] As to the nomenclature of chemical substances, it must be explained, that whilst the elementary bodies receive arbitrary names (those of newly discovered metals, however, being made to terminate in *um*), the names of compounds are framed according to definite rules. When non-metallic elements unite with metallic bodies, or with other non-metallic bodies, the compound is known by a name ending in *ide*, taken from the non-metallic element, or from that one which is most opposed in character to a metal. Thus, compounds formed by oxygen and the metals are termed oxides, those of iodine and the metals, iodides, &c. The oxides, however, are divided into three groups. Those which resemble potash and soda, or the oxides of silver and lead, are termed alkaline, or basic oxides. Those which possess properties opposed to the former, and have a strong tendency to unite with them, are termed acids, such as sulphuric acid. The third group consists of oxides, which show little disposition for forming combinations, and are styled neutral oxides. When two acids are formed by oxygen and another element, the name of that which has the less proportion of oxygen terminates in *ous*, and that with the greater proportion of oxygen in *ic*; thus sulphurous and sulphuric acids. The salts which these acids form, when combined with bases, are distinguished as sulphites and sulphates. For a list of the elementary bodies, see EQUIVALENT.

CHENOPODI'ACEÆ, in Botany, a natural order of apetalous exogens, composed of herbaceous plants or small shrubs. Many weeds belong to this order, but other members of it are of great value to man. Shore plants of the genera *Salicornia*, *Salsola*, and *Suæda*, were formerly the sources from which soda was obtained. Common spinage (*Spinacia oleracea*), mangold wurzel, and beet (both belonging to the genus *Beta*), and garden orach (*Atriplex hortensis*), belong to the order. The seeds of *Chenopodium quinoa* are extensively employed as food in Peru, under the name of rice. Another *Chenopodium* is cultivated as a grain crop in the western Himalayas. The common weed goose-foot is a species of the same genus.

CHER'RY (*cerise*: *Fr.*, from *Cerasus*, a city in Pontus, whence it was first brought to Rome), the *Prunus Cerasus*, a fruit, the original stock of which is the wild cherry. The gradual effect of cultivation has been the production of several varieties, all superior to the fruits of the parent stock. The wood of the cherry tree is much used by turners, cabinet-makers, &c. The gum that exudes from its bark is said to be, in many respects, equal to gum arabic.

CHER'RY-LAUREL, the name popularly given to the *Cerasus Laurocerasus*, a shrub belonging to the same nat. ord. as the almond, plum, and cherry. It is not related to the true laurels. The leaves abound with prussic acid.

CHER'SONESE (*chersonēsos*: *Gr.*), a tract of land, of any indefinite extent, which is nearly surrounded by water, but is united to a larger tract by a neck of land or isthmus: a *peninsula*. The peninsula of Greece was called the Chersonese.

CHERT, in Mineralogy, a sub-species of rhomboidal quartz, which often occurs in metallic veins. It is somewhat translucent, and of various colours.

CHER'UBIM (*Heb.*, the plural of *cherub*), an order of angels, two of which, by the command of God, were represented as overshadowing the propitiatory or mercy seat. The form usually given to them by painters and sculptors is a child's head between wings. In the celestial hierarchy they are placed next in order to the seraphim.

CHESS (*échecs*: *Fr.*), a game played by two persons sitting opposite to each other, and having between them a chequered board, containing sixty-four squares, alternately white and black. It is a game of Asiatic origin, but it has become a favourite with all civilized nations. The Chinese pretend to have known it 200 years before the

Christian era. In the 6th century it was brought from India to Persia, whence it was spread by the Arabians and the Crusaders all over the civilised world. The chess-board is so placed that each player has a white square at his right hand. Each side has eight men, consisting of a king, queen, two knights, two bishops, and two rooks or castles, besides eight pawns or foot-soldiers. The object of the game is to bring the adversary's king into such a situation that he would be taken at the next move, which is called *checkmating*. [See CHECKMATE.]

CHEST (*cista*: *Lat.*; from *kistē*, a chest: *Gr.*), in Anatomical language, the *thorax*, that cavity of the body which is between the neck and the belly, and contains the lungs, heart, &c.

CHEST'NUT, or CHES'NUT (*châtaigne*: *Fr.*). The SPANISH-CHESTNUT is a noble tree, the *Castanea vesca* of botanists. It produces a well-known edible fruit.——The HORSE-CHESTNUT, a tree of the genus *Æsculus*, the fruit of which is not eaten. The common kind is a native of the north of Asia, and admired for the beauty of its flowers. The *scarlet-flowering horse-chestnut* is a native of Carolina and Brazil.

CHEVAL'-DE-FRISE (a Friesland horse: *Fr.*), generally used in the plural, CHEVAUX-DE-FRISE, spikes of wood, pointed with iron, five or six feet long, fixed in a strong beam and used as a fence against cavalry, or to stop a breach, &c.

CHEVALI'ER (*Fr.*), a foreign title; a cavalier or knight.——In Heraldry, a horseman armed at all points.

CHEVET (*Fr.*), in Architecture, a peculiar form of apse, almost exclusively confined to French-Gothic churches, but something like it is to be seen in Henry VII.'s chapel, Westminster Abbey. It has been defined as an apse enclosed by an open screen of columns, and opening into an aisle which is in connection with apsidal chapels.

CHEVRETT'E (an andiron: *Fr.*), a military term for a kind of gin, or machine, for raising guns or mortars into their carriages.

CHEV'RON (a rafter: *Fr.*), in Heraldry, an honourable ordinary, representing two rafters of a house joined together, or meeting at the top.——PER CHEVRON, a division of the field by two single lines, rising from the two base points, and meeting in a point above, in the same way as the chevron.

CHIAROSCU'RO (the clear obscure: *Ital.*), the art of distributing lights and shadows in painting, so as to give effect to the composition. It is of the highest importance, and is one of the most difficult branches of an artist's study, because of the want of precise rules for its execution. Rembrandt has rendered himself famous for the striking effect of his *chiaro-oscuro*.

CHIAS'TOLITE (*chiastos*, marked with the Greek x, a cross; and *lithos*, a stone: *Gr.*), a curious kind of crystallized mineral, sometimes called *macle*. It consists chiefly of silex and alumina, with a little oxide of iron.

CHICA'NERY (*chicanerie*: *Fr.*), mean or unfair artifices used to perplex a cause or obscure the truth; applied either in a legal sense, when justice is intended to be perverted, or to disputatious sophistry.

CHI'CORY, the popular name of the plant known to botanists as *Cichorium intybus*, nat. ord. *Compositæ*. The root is roasted, reduced to powder, and mixed with ground coffee.

CHIEF (chef: *Fr.*), in Heraldry, one of the honourable ordinaries, which occupies the upper part of the escutcheon. As the head is the chief part of a man, so is the chief the principal part of the escutcheon: it contains a third part of the field.

CHIL'BLAIN, a tumour occasioned by suddenly warming a cold part, or suddenly cooling a heated part: hence the portions of the body most subject to chilblains are the toes, fingers, ears, &c.

CHIL'IAD (*chilias*, a thousand: *Gr.*), the sum or number of one thousand. Hence *Chil'iarch* denotes the military commander or chief of a thousand men; *Chil'iarchy*, a body consisting of a thousand men; *Chiliahe'dron*, a figure of a thousand equal sides; and *Chil'iagon*, a figure of a thousand angles and sides.

CHILL'ED IRON, iron cast in metal moulds, in consequence of which its surface is rapidly cooled, and it is rendered harder than when cast in ordinary moulds.

CHIL'TERN-HU'NDREDS, a range of chalky hills, extending through parts of Oxfordshire and Buckinghamshire, belonging to the crown, and having the office of Steward of the Chiltern Hundreds attached to it. As it is an established rule that a member of parliament receiving a place under the crown cannot continue to sit unless re-elected, the acceptance of the stewardship of the Chiltern Hundreds is a formal manner of resigning a seat. The term *Chiltern* is applied, generally, to hundreds that lie in the hilly part of a county.

CHIME'RA (*chimaira*: *Gr.*), in its modern acceptation, a vain or idle fancy; a creature of the imagination, full of contradictions and absurdities. In fabulous history, a monster with three heads, that of a lion, a goat, and a dragon, vomiting flames. The fore parts of the body were those of a lion, the middle was that of a goat, and the hinder parts were those of a dragon.

CHIMES (*chiamare*, to call: *Ital.*), the musical sounds of bells struck with hammers, often arranged, and set in motion by clockwork. In a clock, a kind of periodical music, produced at certain hours by a particular apparatus.

CHIM'NEY (*cheminée*: *Fr.*; from *kaminos*, a furnace: *Gr.*), in Architecture, a structure of brick or stone containing a funnel to convey smoke and other volatile matter through the roof of a building, from the grate or hearth.

CHIMPAN'ZEE, the *Troglodytes niger*, a large ape, inhabiting the western coast of Africa from about 10° N. to 10° S. of the equator. It attains the height of four feet, and its body is clothed with long coarse black hair, but the hands, face, and large ears are naked. The teeth resemble those of man. The head is flattened above, and has a retiring forehead, and a high bony crest over the high brows. The facial angle is 85°. The fore-fingers, when the animal is upright, do not quite reach the knee. In walking, they tread on the outer edge of the foot. It is said that they live in societies in the wood. Specimens have been brought alive to this country, and, though good-tempered when young, they become ferocious as they grow older.

CHINA, GREAT WALL OF. This wonderful work was erected about 2000 years ago, for the purpose of protecting the Chinese people from the attacks of the northern Tartars. Its length is computed at 1250 miles, and it proceeds up the hills and through the valleys, regardless of the difficulties of the way. There are square towers, about 37 feet high, at irregular intervals. The interior of the wall is earth or rubbish, cased on each side with stone or brick, and having on the top a platform of square tiles. Its height is about 20 feet, with a thickness of 25 feet at the base, and 23 feet at the top. Millions of labourers were employed upon it, by the first universal monarch of China, for ten, or, as some think, for only five years. It is now falling to ruin.

CHI'NA-WARE, takes its name from China, whence the Dutch and English merchants first brought this species of ceramic manufacture into Europe; and is also called *porcelain*, from the Portuguese *porcellana*, a cup or vessel. [See PORCELAIN.] The Japan china is considered superior to all other, of oriental manufacture, in its close and compact granular texture, its sonorousness when struck, its extreme hardness, its smooth and shining appearance, and its capability of being used for boiling liquids. With the Chinese potters, the preparation of the clay is carried on constantly, and it usually remains in the pits from ten to twenty years prior to being used; for the longer it continues there, the greater is its value. The Dresden china has some qualities which render it decidedly superior to the oriental. It exhibits a compact, shining, uniform texture, resembling white enamel, while it possesses firmness, solidity, and non-fusibility by heat. The manufacture of china has been carried to a pitch of great excellence in France and England. The requisite materials for the best hard china are sparingly supplied by nature; but modern chemistry has thrown much light on the ceramic art, not only in enabling the manufacturer to analyze more perfectly the bodies which constitute these wares, but also in determining the exact proportions in which they combine; and if proper attention is paid to the proportions of the several components, there is seldom any failure. Silica obtained from *flints*, and alumina, are the indispensable ingredients; and when these substances are properly combined by means of water, their reciprocal tendencies cause so strong a union that, although hardened merely by evaporation, they resist decomposition by the atmosphere. China is either painted by the hand, which is the most beautiful, but most expensive way; or the designs are very ingeniously transferred from an engraved copper plate, by means of paper. The colours or enamels with which these designs are executed on the glazed surface of ware, with substances so vitrifiable as readily to acquire lustre at a moderate heat, have not yet been in use quite a century.

CHINTZ, a peculiar pattern on calico, in which flowers and other devices are printed in five or six different colours, on a white or coloured ground.

CHIRA'GRA (*Gr.*: from *cheir*, the hand; and *agra*, a catching), in Medicine, a name for gout in the hand.

CHI'ROGRAPH (*cheirographon*: from *cheir*, the hand; and *grapho*, I write: *Gr.*), among the Anglo-Saxons, any public instrument of gift or conveyance, attested by the subscription or crosses of witnesses. A deed requiring a counterpart was engrossed twice on the same piece of parchment, with a space between, on which was written *chirograph*; and the parchment being cut through this word, one portion was given to each party. The chirograph was also anciently used for a fine; and this manner of engrossing fines, and cutting the parchment in two pieces, was, until recently, retained in the chirographer's office, in the Court of Common Pleas.

CHIROL'OGY (*cheir*, the hand; and *logos*, speech: *Gr.*), the art or practice of communicating thoughts by signs made with the hands and fingers, as a substitute for language.

CHI'ROMANCY (*cheir*, the hand; and *manteia*, prophecy: *Gr.*), a species of divination, drawn from the different lines and lineaments of a person's hand. The modern word is *palmistry*. Several books which rank amongst the curiosities of literature have expounded the mysteries of chiromancy. When credulity was more general than at present, chiromancy was much practised. Sir Thomas Browne had evidently an inclination to it, from the way he spoke of 'certain mystical figures in our hands.'

CHIRON'OMY (*cheironomia*: from *cheir*, the hand; and *nemo*, I manage: *Gr.*), in Antiquity, the art of representing any transaction by the gestures of the body, more especially by the motions of the hands. This made a part of liberal education; it had the approbation of Socrates, and was ranked by Plato among the political virtues.

CHIS'LEU, the ninth month of the Jewish year, answering to the latter part of November and the beginning of December.

CHI'TON (a coat of mail: *Gr.*), a genus of marine mollusca, remarkable for the eight plates with which the upper part of the body is protected. The under part forms the disk-like foot by which the animal moves. The genus is placed amongst the Gasteropoda, and more than 200 species are distributed throughout the world. Ten species are known on our own shores.

CHIV'ALRY (*chevalerie*: *Fr.*), the name anciently given to knighthood; also the martial exploits and qualifications of a knight. Chivalry, as a military dignity, is supposed by some to have been first established soon after the death of Charlemagne, and by others to have arisen out of the crusades, because in these expeditions many chivalrous exploits were performed, and a proud feeling of heroism was engendered. In describing the origin, object, and character of this military institution, Gibbon, the historian, thus speaks of a successful candidate for the honour of knighthood, and eulogises the profession: 'He was created a knight in the name of God, of St. George, and of St. Michael the Archangel. He swore to accomplish the duties of his profession: and education, example, and the public opinion, were the inviolable guardians of his oath. As the champion of God and the ladies, he devoted himself to speak the truth; to maintain the right; to protect the distressed; to practice *courtesy*, a virtue less familiar to the infidels; to despise the allurements of ease and safety; and to vindicate in every perilous adventure the honour of his character. The abuse of the same spirit provoked the illiterate knight to disdain the arts of luxury and peace; to esteem himself the sole judge and avenger of his own injuries; and proudly to neglect the laws of civil society and military discipline. Yet the benefits of this institution, to refine the temper of barbarians, and to infuse some principles of faith, justice, and humanity, were strongly felt, and have been often observed. The asperity of national prejudice was softened; and the community of religion and arms spread a similar colour and generous emulation over the face of Christendom. Abroad in enterprise and pilgrimage, at home in martial exercise, the warriors of every country were perpetually associated; and impartial taste must prefer a Gothic tournament to the Olympic games of classic antiquity. Instead of the naked spectacles which corrupted the manners of the Greeks, and banished from the stadium the virgins and matrons, the pompous decoration of the lists was crowned with the presence of chaste and high-born beauty, from whose hands the conqueror received the prize of his dexterity and courage.

CHLA'MYS (*Lat.*, from *chlamūs: Gr.*), in Antiquity, a broad woollen upper garment, or scarf, worn by Grecian horsemen, particularly by those belonging to the army.

CHLO'RAL (an abbreviation formed from the *chlor* of chlorine, and the *al* of alcohol), a chemical substance, consisting of chlorine, carbon, and oxygen, obtained by the action of chlorine on alcohol. It is a limpid, colourless liquid, similar in odour and appearance to the oily fluid which chlorine forms with olefiant gas; but differing from it essentially in density and volatility.

CHLO'RATE, in Chemistry, a compound of chloric acid with a salifiable base.

CHLO'RIDE, in Chemistry, a compound of chlorine with another substance, as the chloride of azote, chloride of calcium, &c.

CHLO'RINE (*chlōros*, green: *Gr.*), a greenish gas, discovered by Scheele in 1774. It is not only irrespirable, but produces the most injurious effects when incautiously inhaled. It is an elementary body, and is nearly twice as heavy as water. Submitted to pressure, it forms a liquid. Phosphorus, and some of the metals, in a finely divided state, take fire spontaneously in it. Its most remarkable property is its power of bleaching; and it has rendered the old and tedious method of exposure to the air unnecessary. It is liberated from sea salt by sulphuric acid and peroxide of manganese. It combines with hydrogen to form a powerful acid, the hydrochloric.

CHLO'RITE, a mineral of a grass-green colour, opaque, and composed of small shining grains. It is usually found in small masses in schist, and it is considered a form of mica.

CHLORO-CARBON'IC ACID, a compound of chlorine and carbonic oxide, formed by exposing a mixture of the two gases to the direct solar rays.

CHLO'ROFORM (*chlorine* and *formyle*), called also *chloro-formyle*, or the *perchloride of formyle*; a new anæsthetic agent, used as a substitute for sulphuric ether in surgery. Its constituents are two atoms of carbon, one of hydrogen, and three of chlorine. It is a dense, limpid, colourless liquid, readily evaporating, and possessing an agreeable, fragrant, etherial odour, and a saccharine pleasant taste. When poured upon water the greater part sinks in globules, which are of a milk-white appearance if the chloroform is not perfectly free from alcohol. It is prepared, on the large scale, by cautiously distilling a mixture of good commercial chloride of lime, water, and alcohol. The whole product passes over with the first portion of the water. When its vapour is inhaled, it induces insensibility more rapidly and effectually than the vapour of ether; hence its use in the performance of painful surgical operations. A little of the liquid diffused upon the interior of a hollow-shaped sponge, a pocket-handkerchief, or a piece of linen or paper, and held over the mouth and nostrils so as to be fully inhaled, generally suffices in about a minute or two to produce the desired effect, but from its action on the heart, it ought never to be administered except under the superintendence of a medical man.

CHLORO'PAL (*chlōros*, green; and *opallios*, the opal: *Gr.*), a greenish-yellow mineral, associated with the opal of Hungary. It is a hydrated silicate of iron.

CHLO'ROPHANE (*chloros*, green; and *phaino*, I make to shine: *Gr.*), in Mineralogy, a variety of fluor spar, found in Siberia. When placed on a heated iron it gives a beautiful emerald green light.

CHLO'ROPHYL (*chloros*, green; and *phullon*, a leaf: *Gr.*), the green matter of the leaves of vegetables.

CHLORO'SIS (*chloros*, green: *Gr.*), a disease incident to females, characterized by a pale or greenish hue of the skin.

CHOC'OLATE, a cake or paste, made from the kernel of cocoa, mixed with sugar and some aromatic substance, such as cinnamon or vanilla.

CHOIR (*choros: Gr.*), that part of a cathedral where the service is performed. Also, the body of singers there assembled. Hence the word *chorister* is used for a singer whose vocal powers are exercised in divine service.

CHO'KE-DAMP, the miner's name for

carbonic acid gas, which is frequently found in mines and is irrespirable. [See DAMPS.]

CHOL'AGOGUES (*cholos*, bile; and *ago*, I conduct; *Gr.*), medicines which expel or evacuate bilious fæces.

CHOL'ERA (*Gr.*, from *cholē*, bile), a disease of which there are two species: *Cholera spontanea*, which happens in hot seasons without any manifest cause: and *Cholera accidentalis*, which occurs after the use of food that digests slowly and irritates. In warm climates it is met with at all seasons of the year, and its occurrence is very frequent; but in England and other cold climates it is prevalent in the middle of summer, particularly in the month of August, and the severity of the disease has usually been greater in proportion to the intensity of the heat. It is characterized by an evacuation of bile, attended with anxiety, painful gripings, vomitings, spasms of the abdominal muscles, and those of the calves of the legs. The disease sometimes proceeds with violence, and, if unchecked in its early stages, great depression of strength ensues, and it may quickly terminate in death. But it must not be confounded with the

CHO'LERA MOR'BUS (*cholera* and *morbus*, a disease: *Lat.*), the *Asiatic*, or *spasmodic cholera*. In Hindostan, spasmodic cholera has probably always existed as a comparatively mild disease; but there is no evidence to show that the Indian cholera ever bore the epidemic character, or was entitled to rank with pestilential scourges of the worst description, till August, 1817, when it suddenly broke out with unprecedented malignity, attacking the natives first, and manifesting itself among the Europeans in the following month. It raged with great violence, from January to May, 1818, extending its destructive influence across the country from the mouth of the Ganges to its confluence with the Jumna. It appeared in its most malignant form at Benares, where in two months 15,000 persons perished. In the district of Gorrakpore 30,000 were carried off in a month. By November the epidemic had reached the grand army, commanded by the Marquis of Hastings, consisting of 10,000 troops and 80,000 followers: and in twelve days nearly 9000 men had fallen victims to it. Previous to the 14th, it had overspread the camp, sparing neither age nor sex; from the 14th to the 20th, the mortality had become so extensive that the stoutest hearts were yielding to despair, and the camp wore the aspect of a general hospital. The noise and bustle almost inseparable from the presence of a multitude of human beings had nearly subsided into stillness: and nothing was to be heard but the groans of the dying, or the wailing for the dead. In 1819 it reached the kingdom of Arracan: it then extended itself into Siam, and after destroying 40,000 in Baku, the capital, it passed into the peninsula of Malacca. From thence it travelled to China. Canton was attacked in 1820; and at Pekin the mortality was so frightful that the government was obliged to have the dead interred at its own expense. From China it passed to the Philippine and Spice Islands. Thus, in little more than two years, did it traverse a space, in Eastern Asia, of 1300 leagues from north to south, and about 1000 leagues from west to east. During the next two years Arabia, Persia, Mesopotamia, and Syria, were overrun by the dreadful pestilence. In September, 1823, it entered Astracan, a large and populous town on the northern shore of the Caspian. As soon as this became known to the Russian government, a medical commission, composed of six physicians, was despatched to investigate its character, and every preventive measure was resorted to. How far these precautions were connected with the result it may be difficult to decide; but certain it is, the disease got no farther in that direction that year than Astracan, and did not again visit Russia until towards the close of 1828, when it unexpectedly appeared at Orenburg, and in 1830 it again made its insidious entrance at Astracan. At length it reached Moscow, where a *cordon sanitaire* was speedily established, temporary hospitals erected, and the emperor himself visited the town when the disease was at its height. At first the mortality was as great as nine-tenths of all who were attacked, but the number who were infected gradually decreased, and the mortality proportionately diminished. Poland, Prussia, and other parts of Germany, soon after felt its devastating effects: in November, 1831, it reached England; in March, 1832, it broke out at Paris, where 20,000 fell a sacrifice to it in a short time; and in June, 1832, it appeared at Quebec, in Canada, and subsequently spread over the whole American continent. In 1849 and 1854 it reappeared in all its terrors, and, as in 1832, made the tour of the globe; the main points in which it differed from the former visitation being the longer continuance of the disease in the places visited, the greater tendency to subside and reappear, and the higher mortality it occasioned. The most remarkable feature of this disease is the suddenness of its attack. It begins with watery diarrhœa, or other generally slight indisposition, which is followed by vomiting or purging of a white or colourless fluid, violent cramps, and great prostration and a *collapse*, which occur at the same time with the vomiting and cramps, or shortly after them. Should the patient survive the last train of symptoms, a state of excitement and fever supervenes. For a considerable time the medical world was much divided in opinion as to the contagious or non-contagious nature of cholera; the disputes on this subject, however, have now nearly subsided, the great majority of medical men being persuaded that the disease is epidemic, and not contagious in its character.

CHOLES'TERIC ACID (*cholē*, bile; and *stereos*, solid: *Gr.*), a peculiar acid, formed from *cholesterine* and *nitric acid*. It is in crystals of a yellowish-white colour, scarcely soluble in water, but perfectly so in boiling alcohol.

CHOLES'TERINE (same *deriv.*), a pearly substance, found abundantly in human biliary calculi.

CHONDROL'OGY (*chondros*, a cartilage; and *logos*, a discourse: *Gr.*), a description of cartilages.

CHOP'STICKS, the Chinese substitutes for our knife and fork at meals. They are thin pieces of ivory, ebony, or bamboo, and are used with extraordinary dexterity in carrying food to the mouth, the smallest pieces being readily laid hold of and conveyed to the lips. More than 400 millions of the human race employ these simple implements.

CHORD (*chordē*, the string of a lyre: *Gr.*), in Music, the combination of two or more sounds heard at the same time, and forming a concord or discord; as a third, fifth, and eighth.——In Geometry, a right line drawn from one part of the arc of a circle to another.

CHORE'A (*choros*, a dance: *Gr.*), a disease which manifests itself in convulsive motions of the limbs, face, head, and trunk, and is called *St. Vitus's dance.* It is most common in early life, from ten or twelve to puberty. The early stages should be attentively watched, and great care should be taken in the cure, lest relics of it be retained through life.

CHORE'US (*Lat.*; from *choreios*, literally, belonging to a dance: *Gr.*), in Ancient Poetry, a foot of two syllables, the first long, and the second short; the *Trochee*.

CHORIAM'BUS, in Ancient Poetry, a compound foot, consisting of a choreus and an iambus.

CHOROG'RAPHY (*chorographia*, from *chōra*, a district; and *grapho*, I write: *Gr.*), the art of delineating or describing some particular country or province. It differs from *geography* as a description of a particular country differs from that of the whole earth, and from *topography* as the description of a country from that of a town or district.

CHO'ROID (*chorion*, leather; and *eidos*, appearance: *Gr.*), in Anatomy, the coat of the eye immediately under the sclerotica; also the inner membrane investing the brain, the pia mater, &c.

CHO'RUS (*choros*: *Gr.*), in ancient dramatic poetry, one or more persons present on the stage during the representation, uttering an occasional commentary on the piece, preparing the audience for events that are to follow, or explaining circumstances that cannot be distinctly represented. Several examples of its use may be referred to by the English reader in the plays of Shakspeare. In Tragedy, the chorus was at first the sole performer; at present it is wholly discontinued on the stage.——CHORUS, in Music, those parts of a song at which the whole company are to join the singer in repeating certain couplets or verses.

CHOUGH (*ceo*: *Sax.*), or red-legged crow, the *Fregilus graculus* of naturalists. It is nearly of the size of the common crow, and mischievous like the magpie. In this country it builds in cliffs and old buildings near the sea, and is chiefly found in Cornwall, but it is an inhabitant of various parts of Europe, and has been met with in the Himalayas. Its plumage is black, the bill, legs, and feet red.

CHRISM, or **CHRIS'OM** (*chrisma*, an ointment: *Gr.*), in the Romish and Greek churches, the oil used in the administration of baptism, confirmation, ordination, and extreme unction. It is consecrated in Holy Week, with many ceremonies.

CHRIST'MAS-ROSE, the *Helleborus niger* of botanists, a plant belonging to a poisonous genus. It takes its common name from putting forth its white flowers about Christmas.

CHRIST'S-THORN, the *Paliurus aculeatus* of botanists, nat. order, *Rhamnaceæ*, a deciduous thorny shrub, which grows in the south of Europe and Judæa. It is thought that the crown of thorns at the crucifixion was taken from this plant. The fruit is curious, somewhat resembling a head with a broad-brimmed hat.

CHRO'MATE, in Chemistry, a salt or compound formed by the union of chromic acid and a base.

CHROMAT'IC (*kroma*, colour: *Gr.*), in Music, a term indicating that which proceeds by several consecutive semitones.

CHROMAT'ICS (same *deriv.*), that part of optics which explains the several properties of light and colour. Newton showed that colour is not a quality inherent in bodies. If viewed in light of any particular colour, they are of that colour. Every substance, however opaque in ordinary circumstances, if sufficiently thin, is capable of transmitting light: thus gold. Hence, all ponderable matter absorbs some light: the rest is reflected, or, if not extinguished in its passage, is transmitted. A portion of the light which falls on every body passes through its surface, and is to some extent reflected back by its particles. But the different coloured rays are unequally absorbed, which gives rise to the production of colours with that portion of the absorbed rays which are reflected back, and reach the eye of the spectator. Colour is produced by the interference of rays [see INTERFERENCE], and also when white light is decomposed by means of a refracting body of appropriate shape. [See SPECTRUM.]

CHRO'MIUM (same *deriv.*), in Mineralogy, a metal which in its highest degree of oxidation is an acid (chromic acid) of a ruby red colour. It takes its name from the various and beautiful tints which its oxide and acid communicate to the minerals into whose composition they enter. Thus chrome gives a fine deep green to the enamel of porcelain, &c. *Chrome yellow*, the artificial chromate of lead, is a beautiful pigment. Chromium itself is obtained from the oxide by exposing it along with charcoal, to the highest heat of a powerful furnace. It is hard, brittle, and of a greyish white colour. It is very difficult to melt, and the strongest acids have little effect upon it. Its specific gravity is 5·9; its equivalent 26·7. Bichromate of potash, which forms fine red tabular crystals, is largely manufactured for the use of dyers, photographers, and others.

CHRO'MO-LITHOG'RAPHY. The obtaining lithographic impressions by means of coloured inks. [See LITHOG'RAPHY.]

CHRON'IC (*chronos*, time: *Gr.*), in Medicine, a term applied to inveterate diseases or those of long duration; in contradistinction to those which make more rapid progress, and are termed *acute*.

CHRON'OGRAM (*chronos*, time; and *gramma*, a writing: *Gr.*), an inscription in which a certain date or epoch is expressed by some of the letters. They are sometimes in a larger character. Thus, in a medal of Gustavus Adolphus, 'chrIstVs DVX, ergo trIVMphVs,' 'Christ was our leader, hence our success.' 'MDXVVVII' indicates the year MDXXVII.

CHRONOL'OGY (*chronologia*: from *chronos*, time; and *logos*, a discourse: *Gr.*), the science which determines the dates of events and the civil distinctions of time. The divisions of time are either natural or artificial; the *natural* are the year, month, week, day, and hour, deduced from the motions of the heavenly bodies and suited to the purposes of ordinary life; the *artificial* are the various *eras*, commencing with arbitrary *epochs*, or important events. The confusion and doubt attending chronological research arise not only from the number of eras, but from their subdivision. The natural divisions of time are not always employed. Thus, the lapse of time has been frequently estimated by generations, or the reigns of kings. And even when the solar year was used, as neither its beginning nor end is marked by any striking event, its precise length was not at first accurately ascertained. Sometimes the solar year was adopted, and sometimes the lunar; at others, as among the Jews, a combination of both. Hence there is little agreement between chronologers regarding the most important events of antiquity. There have been upwards of 200 different calculations of the number of years between the creation and the commencement of the Christian era; and there are 3501 years of difference between the longest and shortest period assigned.

CHRONOM'ETER (*chronos*, time; and *metron*, a measure: *Gr.*), a watch of a peculiar construction, or any instrument that measures time with great exactness. Chronometers are at present much employed by navigators in determining the longitude at sea. They differ from watches chiefly in the principle of their escapement, which is so constructed, that the balance is entirely free from the wheels during the greater part of its vibration, and is compensated for changes of temperature: also the balance spring, unlike that of a watch, is a spiral, whose coils are all of the same size, and not in the same plane.

CHRYS'ALIS (*chrusallis*, from *chrusos*, gold: *Gr.*), or AURE'LIA (*aurum*, gold: *Lat.*), the second metamorphosis of a lepidopterous insect, after which it becomes a butterfly or moth.

CHRYSAN'THEMUM (*chrusos*, gold; and *anthos*, a flower: *Gr.*), in Botany, a genus of plants with handsome flowers appearing in autumn, nat. ord. *Compositæ*.

CHRYS'OBERYL (*chrusoberullos*: from *chrusos*, gold; and *berullos*, a beryl: *Gr.*), a yellowish gem, generally found in small round pieces, or crystallized in eight-sided prisms. It is used in jewellery, and is next to the sapphire in hardness. Its chief constituents are alumina and glucina. It has been found in Brazil and North America.

CHRYS'OLITE (*chrusos*, gold; and *lithos*, a stone: *Gr.*), a mineral of a greenish hue, often transparent. It is sometimes granular, and at other times occurs in small crystals. It is found in Upper Egypt, and is employed in jewellery. It is composed of magnesia, silica, and oxide of iron. Olivine is considered a variety of it.

CHRYSOM'ELA (*chrusos*, gold; and *melas*, black: *Gr.*), a genus of phytophagous beetles. The elytra usually possess a metallic lustre.

CHRYSOPŒ'IA (*chrusos*, gold; and *poieo*, I make: *Gr.*), in Alchemy, that part of the art which professes to teach the making of gold out of less perfect metals.

CHRYS'OPRASE (*chrusos*, gold; and *prason*, a leek: *Gr.*), in Mineralogy, an amorphous quartz, coloured light green by oxide of nickel. It has been found in Silesia and North America.

CHRYSOSPLE'NIUM (*chrusos*, gold; and *splēn*, the spleen: *Gr.*, from its supposed power in diseases of the spleen), a genus of plants, nat. ord. *Saxifragaceæ*, including the golden saxifrage, a herb wild in Britain.

CHURCH (*kirche*: *Germ.*), in religious affairs, a word which is used in several senses. It means:—1. The collective body of persons professing one and the same religion; or that religion itself: thus, we say the Church of Christ. 2. Any particular congregation of Christians associating together; as the Church of Antioch. 3. A particular sect of Christians; as the Greek Church, or the Church of England. 4. The body of ecclesiastics, in contradistinction to the laity. 5. The building in which a congregation of Christians assembles, &c.

CHURCHWAR'DENS, officers annually chosen by the minister and vestry to superintend the church, its property, and concerns.

CHYLE (*chulos*: *Gr.*), a white or milky fluid in the stomach, consisting of the finer and more nutritious parts of the food, which is received into the lacteal vessels, assimilated into blood, and gradually converted into the different substances which constitute the animal body.

CHYLIFAC'TION (*chulos*, chyle: *Gr.*; and *facio*, I make: *Lat.*), the process of digestion by which the aliment is converted into chyle.

CHY'LO'POIE'TIC (*chulos*, chyle; and *poieo*, I make: *Gr.*), having the power to convert into chyle.

CHYME (*chumos*, juice: *Gr.*), the result of the action of the stomach upon the food conveyed to it before its conversion into chyle.

CICA'DA (a tree cricket: *Lat.*), a genus of homopterous insects, allied to the grasshoppers and locusts. They feed on the juice of shrubs and trees, having a peculiar apparatus for piercing the bark. The organ of sound is peculiar to the male, and is situated on each side of the lower and anterior part of the abdomen. In warm regions, such as the south of France and

Italy, these insects, in summer, make a loud and continual noise. This chirping song has been celebrated by the ancient poets of Greece and Rome. The manna of the shops is the inspissated juice of the *Fraxinus Ornus*, poured out from wounds inflicted by the *Cicada Orni*.

CICATRIC'ULA (a *dim.* of *cicatrix*, a scar: *Lat.*), a small whitish speck in the yolk of an egg, supposed to be the germinating point or first rudiment of the chick. Whatever way the egg is turned, the part of the yolk containing it is always uppermost.

CIC'ATRIX, or CIC'ATRICE (*cicatrix: Lat.*), in Surgery, a scar, or elevation on the skin, caused by callous flesh, and remaining there after a wound or ulcer has healed.

CICATRI'ZANT (same *deriv.*), a medicine or application that promotes the formation of a cicatrix, called also an escharotic, agglutinant, &c.

CICERO'NE (probably from the Italian guides having been ironically compared, on account of their garrulous eloquence, with Cicero), an individual who acts as a *guide*.

CICERO'NIANS, epithets given by Muretus, Erasmus, &c., to those moderns who were so ridiculously fond of Cicero as to reject every Latin word, as obsolete or incorrect, that could not be found in some one or other of his works. The word *Ciceronian* is also used as an epithet for a diffuse and flowing style, and a vehement manner.

CICISBE'O (*Ital.*), one who dangles about females. It was formerly the custom for almost every fashionable Italian lady to have a *cicisbeo* in her train.

CID, Romances of the, a number of ancient Spanish poems, celebrating the martial deeds and love adventures of Rodrigo Laynez, who was born in the reign of Sancho, King of Castille, towards the beginning of the 11th century, and died in 1099. He was surnamed by some Moorish generals whom he had conquered, Es Sayd, or My Lord, corrupted by his countrymen into Cid, who also shortened his Spanish name to Ruy Dias. He is the hero of many poems and dramas of a later age, written in the Spanish and other languages. The Cid was more instrumental, says Sismondi, than even the princes whom he served, in founding the monarchy of Castille, and he is intimately connected with all our ideas of the glory, the love, and the chivalry of the Spanish nation. In the foreground of their history and their poetry, the Cid stands conspicuous, while the renown of his name fills the age in which he lived.

CI'DARIS, in Antiquity, the mitre used by the Jewish high-priest.——In Zoology, a genus of sea-urchins.

CIL'ERY (*cilium*, the eyelid: *Lat.*), in Architecture, a term applied to ornaments of foliage and drapery on the capitals of columns.

CIL'IA (*Lat.*), in Anatomy, the *eyelashes*; certain rigid hairs situated on the arch or tarsus of the eyelids, and bent in a very singular manner. Their object is to keep external bodies out of the eye, and moderate the influx of light.—Also certain microscopic threads, attached by one end to the surfaces of some parts of animals and plants. They have a vibratory or rotatory motion, by means of which certain objects are effected. In man there are cilia in the larynx, trachea, bronchi, and other internal parts. The heads of wheel animalcules possess rings of them.

CIL'IARY (same *deriv.*), in Anatomy, an epithet for several parts belonging to the *cilia*, or eyelashes; as the *ciliary glands*, &c.

CIL'IATED (same *deriv.*), in Botany, furnished or surrounded with parallel filaments, somewhat like the hairs of the eyelids.

CILI'CIUM (*Lat.*; from *kilikion*, made from Cilician goat's hair: *Gr.*), in Hebrew Antiquity, a sort of habit of coarse stuff, formerly in use among the Jews in times of mourning and distress. It is the same with what the Septuagint and Hebrew versions call sackcloth.

CIM'BRIC, pertaining to the Cimbri, the inhabitants of the Cimbric Chersonese, now Jutland.

CIMME'RIAN, pertaining to the country of the Cimmerians, whose chief town was *Cimmerium*, at the mouth of the Palus Mæotis. The ancients pretended that its unexplored portion was involved in darkness; whence the phrase 'Cimmerian darkness,' to denote a deep or continual obscurity. The country is now called the *Crimea*.

CIM'OLITE (from *Cimolus*, now Argentiera, where it abounds; and *lithos*, a stone: *Gr.*), a species of earth, of which there are several varieties; one, of a purple colour, is the steatite, or soap rock: and from another, found in the Isle of Wight, tobacco pipes are made. It is chiefly composed of alumina.

CINCHO'NA. [See QUININE.]

CINC'TURE (*cinctura*, from *cingo*, I bind round: *Lat.*), in Architecture, a ring, list, or orlo, at the top and bottom of a column, separating the shaft at one end from the base, and at the other from the capital.——Also, the cord used in the Roman Catholic church to tie up the alb, or linen garment, of the priest, &c., and fasten other portions of his dress.

CINEMATICS, or KINEMATICS (*kinēma*, a movement: *Gr.*), a branch of Geometry having for its subject the comparison of motions with each other without reference to their causes.

CINERI'TIOUS (*cinericius*, similar to ashes: *Lat.*), an appellation given to different substances, on account of their resembling ashes, either in colour or consistence.

CIN'NABAR (*kinnabari*: *Gr.*), a compound of mercury which is either native or factitious. *Native cinnabar*, the only valuable ore of that metal, a sulphuret, is moderately compact, very heavy, and of a fine striated red colour, chiefly found in New Castile and Carniola. It is called native vermilion, and when used by painters is rendered more beautiful by grinding with gum-water and a little saffron. It is found amorphous, or under some imitative form, and crystallized. *Factitious* cinnabar, the bisulphuret of mercury, is purified by sublimation, and thus rendered of a fine red colour.

CIN'NAMON (*kinamon : Heb.*), a fragrant spice, the bark of the *Cinnamomum Zeylanicum*, a Ceylon tree, belonging to the nat. ord. *Lauraceæ*, which yields, by distillation, an extremely pungent and volatile oil. There is an inferior and insipid kind, often found in commerce; but the true cinnamon is a most grateful aromatic, and one of the best cordial carminative spices. The leaves resemble those of the olive, and the fruit has neither the smell nor taste of the bark; both yield an essential oil.

CINQUECEN'TO (*Ital.*), in the Fine Arts, an expression applied to architectural works, carvings, &c., executed in Italy in the 15th century, or afterwards in imitation of them. The chief architects of that time were Brunelleschi and Bramante; Michael Angelo, Sansovino, and Palladio, adopted the same style, and are classed with the cinquecentists. The words *cinque cento* literally mean five hundred: they are an abridgement of the Italian phrase for one thousand five hundred.

CINQ'UEFOIL (*cinq*, five; and *feuille*, a leaf : *Fr.*), *five-leaved clover*, a leguminous perennial. This plant is sometimes borne in coats of arms.——In Architecture, an ornamental foliation used in arches, the tracery of windows, panellings, &c. It is formed by projecting points, or cusps: so arranged that the intervals between them resemble five leaves.

CINQUE-PORTS (five harbours : *Fr.*), the five ancient ports on the east coast of England, opposite to France: namely, Dover, Hastings, Hythe, Romney, and Sandwich, to which were afterwards added, as appendages, Winchelsea, Seaford, and Rye. As places where strength and vigilance were necessary, and whence ships might put to sea in cases of sudden emergency, they formerly received considerable attention from government. They have several privileges, and are within the jurisdiction of the Constable of Dover Castle, who is called Warden of the Cinque-Ports. Until the time of Henry VIII. the crown seems to have had no permanent navy; the Cinque-Ports having always furnished nearly the whole of the shipping required for the purposes of the state. The jurisdiction of the Cinque-Ports extends along the coast continuously from Birchington, which is to the north-east of Margate, to Seaford in Sussex; and each of them includes one or more ports or towns, some of which are corporate, and others not.

CI'PHER, or CY'PHER (*saphar*, to number: *Heb.*), one of the Arabic characters used in computation, formed thus, 0. A cipher standing by itself signifies nothing; but when placed at the right-hand side of a digit in the *integer's* place, it increases the value of the digit tenfold; thus 500 is ten times greater than 50. But, placed at the left-hand side of a digit in the *decimal's* place, it decreases its value tenfold: thus, ·005 is ten times less than ·05.——CIPHER, a secret or disguised manner of writing; in which certain characters arbitrarily invented and agreed on by two or more persons are made to stand for letters or words. It was not unknown to the ancients: for we learn from Suetonius, that when Julius Cæsar wrote to Cicero, and other friends, regarding his domestic affairs, he used a kind of cipher.

CIP'OLIN (*cipolla*, an onion : *Ital.*), a green marble containing white zones, something like those in the section of an onion.

CIP'PUS (*Lat.*), in Antiquity, a low column either round or rectangular, erected on the high roads or in other places, to show the way to travellers, to serve as a boundary mark, or as a monument over a grave. In the latter case the letters STTL were frequently cut upon it, signifying *Sit tibi terra lævis*, 'may the earth be light upon thee.' Examples of cippi may be seen in the British Museum, and other collections of antiquities.

CIRCE'AN, pertaining to Circe, the fabled daughter of Sol and Perseus, who was supposed to possess a knowledge of magic and venomous herbs, which enabled her to charm and fascinate. Ulysses, according to Homer, was detained a whole year by Circe on her island.

CIRCEN'SIAN GAMES (*Circenses ludi*), a general term, under which were comprehended all combats exhibited in the Roman circus, in imitation of the Olympic games in Greece. Most of the feats of the Romans were accompanied with Circensian games: and the magistrates and other officers of the republic frequently presented the people with them, in order to gain their favour; but the great games were held for five days, commencing on the 15th of September.

CIR'CINATE (*circino*, I make round : *Lat.*), in Botany, an epithet applied to plants whose leaves are rolled in, spirally, and downwards, the tip occupying the centre, as in ferns.

CIR'CLE (*circulus : Lat.*), in Geometry, a plane figure bounded by a curved line, which is called its circumference, and is everywhere equally distant from a point within, called its centre; also, the circumference or periphery itself. A circle is described with a pair of compasses, by fixing one foot in the centre and turning the other round to trace out the curved line. The circumference of every circle is supposed to be divided into 360 equal parts, which are called degrees, and are marked °; and each degree into 60 minutes, marked ′. The rectification of the circle, or the determination of the ratio of the circumference to the diameter, is a problem which has exercised ignorance in all ages. In a rough way, the diameter may be considered as one-third of the circumference. But more accurately, and in ordinary measurements, it may be assumed to have the ratio of 113 to 355; that is, to find the circumference multiply the diameter by 355, and divide the result by 113. These numbers are easily remembered, since they are the three first odd numbers repeated twice, 113 355. The areas of circles are as the squares of their diameters. Thus the areas of two circles, one two feet in diameter and the other three, are as

4 is to 9; 4 and 9 being the squares of 2 and 3. ——**CIRCLES OF LATITUDE** are great circles perpendicular to the plane of the ecliptic, passing through its poles, and through the different stars and planets.——**CIRCLES OF LONGITUDE** are lesser circles parallel to the ecliptic, and diminishing as they recede from it.——**DIURNAL CIRCLES** are circles apparently described by the several stars and other points in the heavens during the rotation of the earth on its axis.——**HORARY CIRCLES**, in Dialling, are the lines which show the hour on dials.

CIR'CUITS (*circuitus*, a going round: *Lat.*), certain districts or divisions of the kingdom, in which the judges hold courts and administer justice, usually during the vacations after Hilary and Trinity terms. The six jurisdictions into which England is divided by the judges are called the Home, Norfolk, Midland, Oxford, Western, and Northern circuits. Wales is divided into North and South circuits; and Scotland into South, West, and North.

CIRCULA'TION (*circulatio*, from *circulor*, I go round: *Lat.*), in Anatomy, the natural motion of the blood in a living animal, by which it proceeds *from* the heart to all parts of the body by the arteries, and returns *to* the heart by the veins. The *circulation of the blood* is performed in the following manner. It is returned to the right auricle of the heart, by the descending and ascending vena cava, which, when distended, contracts and sends it into the right ventricle; from the right ventricle it is propelled through the pulmonary artery, to circulate through and undergo a change in the lungs, being prevented from returning into the right auricle by the closing of valves. Having undergone this change in the lungs, it is brought to the left auricle of the heart by the four pulmonary veins, and thence is evacuated into the left ventricle. The left ventricle, after having been distended, contracts, and throws the blood through the aorta to every part of the body, by the arteries, to be returned by the veins into the vena cava. It is prevented from passing back from the left ventricle into the auricle by a valvular apparatus; and the beginning of the pulmonary artery and aorta is also furnished with similar organs which prevent its returning into the ventricles. [See **AURICLE**.]

CIR'CULUS (*Lat.*), in Anatomy, any round or annular part of the body: as the *circulus oculi*, the orb of the eye.

CIRCUMAM'BIENT (*circum*, about; and *ambio*, I encompass: *Lat.*), an epithet given to anything that surrounds or encompasses another on all sides: it is chiefly used in speaking of the air.

CIRCUMCIS'ION (*circumcisio*, from *circumcido*, I cut round: *Lat.*), a ceremony in the Jewish and Mahometan religions, performed by cutting off the prepuce, or foreskin. The time for performing this rite, according to the Judaical law, was the eighth day, that is, six full days after the child was born. The Jews distinguished their proselytes into two sorts, according as they had been circumcised or not: those who submitted to this rite were looked upon as children of Abraham, and obliged to keep the laws of Moses; the uncircumcised were only bound to observe the precepts of Noah, and were called *Noachidæ*. Circumcision was practised very generally in ancient times by the eastern nations, but not perhaps as a religious ceremony. It is enforced by the Koran on all the disciples of Mahomet.

CIRCUMFERE'NTOR (*circumfero*, I carry round: *Lat.*), a mathematical instrument used by land-surveyors for taking angles by the magnetic needle. It consists of a graduated brass circle, with an index, all of one piece, and a magnetic needle, suspended above the centre of the circle. The index is first directed to one object, and the angle which it makes with the magnetic meridian is noted: it is then directed to the second object, and the angle it makes with the same meridian is also noted. The sum or difference of these angles gives the angle between the objects. The circumferentor is much used in surveying in and about woodlands, commons, harbours, sea-coasts, and in the working of coal-mines, &c., where great accuracy is not necessary.

CIR'CUMFLEX (*circumflexus*, from *circumflecto*, I bend: *Lat.*), in Grammar, an accent said to be a combination of the grave and acute, as used by the French and the ancient Greeks: it lengthens the syllable, and is generally employed where a contraction has taken place, or to distinguish one word from another which is spelt in the same way.

CIRCUMGYRA'TION (*circum*, around; and *gyrus*, a circle: *Lat.*), in Anatomy, the turning a limb round in the socket.

CIRCUMLOCU'TION (*circumlocutio*, from *circumloquor*, I use a periphrasis: *Lat.*), a periphrastical method of expressing one's thoughts, or the saying in many words that which might have been said in few.

CIRCUMPO'LAR (*circum*, around; and *polus*, the pole: *Lat.*), an appellation given to those stars which, from their vicinity to the pole, seem to revolve round it without setting.

CIRCUMSTAN'TIAL EV'IDENCE (*circumstantia*, a circumstance: *Lat.*), in Law, indirect and inferential evidence. Its value varies from absolute proof to a case of vague conjecture.

CIRCUMVALLA'TION (*circumvallo*, I surround with a rampart: *Lat.*), or **LINE OF CIRCUMVALLATION**, in the art of War, is a trench bordered with a parapet, thrown up round the besiegers' camp, or a besieged city. It is composed of earth dug from the ditch, and is rendered more effective by sharp stakes planted in it.

CIR'CUS (*Lat.*; from *kirkos*, a circle: *Gr.*), in Antiquity, a long narrow building, rounded at the ends, its length being generally four times its breadth. It was divided down the centre by an ornamental barrier, called the *spina*, and was used by the Romans for chariot races, &c.: the Circus Maximus, at Rome, was nearly a mile in circumference.——In modern times, the word is applied to designate a circular enclosure for the exhibition of feats of horsemanship, and is often termed a hippodrome

CIR'RI (*cirrus*, a tendril: *Lat.*), in Botany, the fine strings or thread-like filaments, by which some plants fasten themselves to walls, trees, &c., such as those of the vine and passion-flower.——CIRRI, in Ichthyology, certain soft appendages, not unlike little worms, hanging from the under jaws or mouths of some fishes, and commonly called beards. Amongst fresh-water fishes, the barbel and gudgeon—amongst marine fishes, the cod and haddock, have cirri.——CIRRI, in Meteorology, light thin clouds at a considerable elevation in the air: they are often curved, and present an appearance of fibres like a lock of hair.

CIRRIF'EROUS (*cirrus*, a tendril; and *fero*, I bear: *Lat.*), in Botany, an epithet for a plant bearing tendrils.

CIRRI'PEDIA, CIRRI'PEDES (*cirrus*, a tendril; *pedes*, feet: *Lat.*), a class of invertebrate animals, allied in structure to the crustaceans. [See BARNACLES.]

CISAL'PINE (*cisalpinus*: from *cis*, on this side; and *Alpes*, the Alps: *Lat.*), on this side the Alps, as regards Rome. It must be observed, however, that what was *Cisalpine* with respect to the Romans is *Transalpine* with reference to us.

CIS'PADANE (*cispadanus*; from *cis*, on this side; and *Padus*, the Po: *Lat.*), on this side the river Po, with regard to Rome—that is, on the south side.

CISTER'CIANS (*Citeaux*, near Dijon, in France), in Church History, a religious order founded in the 11th century by St. Robert, a Benedictine.

CIS'TUS (*cista*, a chest: *Lat.*), from the seeds being enclosed in a capsule), in Botany, a genus of plants, nat. order *Cistaceæ*, including the rock rose. Many of the species are beautiful evergreen flowering shrubs, and most of them natives of the southern parts of Europe.

CITA'TION (*cito*, I summon: *Lat.*), in Ecclesiastical Courts, the same with *summons* in Civil Courts.——In the Civil Law, reference to an authority or precedent in the course of pleading is termed a *citation*: and hence the same term is applied to a quotation of some law, authority, or passage from a book.

CITH'ERN (same *deriv.*), an ancient stringed instrument, supposed to bear a resemblance to the guitar.

CIT'RATE (*citreum*, the citron: *Lat.*), in Chemistry, a neutral salt, formed by the union of citric acid with a base.

CIT'RIC ACID (same *deriv.*), in Chemistry, an acid which is found in the juices of lemons and limes, and gives them a sour taste. It is a compound of carbon, hydrogen, and oxygen. The crystallized form of the acid contains water. This is one of the acids employed to make effervescing draughts.

CIT'RINE (same *deriv.*), a species of crystal, of a beautiful yellow colour. It is found in columns, which terminate in an hexangular pyramid.

CIT'RON (same *deriv.*), the fruit of the citron-tree (the *Citrus medica* of botanists), which has an upright smooth stem, rising from five to fifteen feet, with a branching head, and large oval spear-shaped leaves. The tree is a native of Upper Asia, from whence it was brought into Greece, and afterwards transplanted into Italy. The citron is cultivated on account of its rind, which is candied or otherwise preserved.——CITRON, a species of melon, used in America, for making a preserve, which resembles the ordinary preserved citron of Europe.

CITY (*cité*: *Fr.*). The word signifies in England a town which is or has been the seat of a bishop, or the capital of his see. It differs from a borough, merely in being of superior dignity. Some cities and a few boroughs, are counties in themselves. War having rendered it requisite that cities should be defensible posts, the smallness of the space they occupied became a consideration of importance. Their inhabitants, therefore, were obliged to crowd themselves together as much as possible; and among the expedients resorted to was that of building apartments over one another, to multiply the number of dwellings without increasing the superficial magnitude of the place. Trade, by collecting a multitude of persons on one spot, has been the origin of many cities. They usually possess, by charter, a variety of peculiar privileges which, though now apparently the result of a narrow policy, were, in their institution, grants of freedom at that time possessed nowhere else; and by them the spell that maintained feudal tyranny was gradually broken.

CIV'ET (*civette*: *Fr.*; from *sibetta*, a scent: *Arab.*), a brown soft unctuous substance, like musk, and resembling it in smell. It is contained in a bag, growing from the lower part of the belly of the civet-cat, the *Viverra civetta*, a carnivorous animal, a native of North Africa. Civet was formerly in high repute for its medicinal qualities, but is now used only as a perfume.

CIV'IC CROWN (*corona civica*), in Antiquity, a crown or garland composed of oak-leaves, given by the Romans to any soldier who had saved the life of a citizen. Various marks of honour were connected with it: the person who received it wore it at the theatre, and when he entered, the audience rose up as a mark of respect.

CIV'IL (*civilis*, pertaining to citizens: *Lat.*), an epithet applicable to whatever relates to the community as a body, or to the policy and the government of the citizens and subjects of a state. It is opposed to *criminal*: thus, a *civil* suit is between citizens alone, and not between the state and a citizen. It is also distinguished from *ecclesiastical*, which relates to the church; and from *military*, which includes only matters relating to the army and navy.——CIVIL ARCHITECTURE, that which is applied to buildings constructed for the purposes of civil life, in distinction from military and naval architecture.——CIVIL DEATH, in Law, that which cuts off a man from civil society, or its rights and benefits (thus banishment, outlawry, &c.), as distinguished from *natural* death.——CIVIL LAW is properly the peculiar law of each state, country, or city; but, as a general term, it means a body of laws which was composed out of the best Roman laws, and is comprised in the Institutes, Code and Digest of Justinian, &c., and, for the most part, was received and observed throughout all the Roman dominions for above 1200 years. The civil law was formerly used under certain restrictions in our ecclesiastical courts, as also in the university courts and the court of admiralty. ——CIVIL LIST, the revenue appropriated to support the civil government, also those officers of the civil government who are paid from the public treasury. It is the sum granted to every British monarch, at the beginning of his reign, for the support of his court and household, of ambassadors, and of the civil government in general. The amount of the civil list, settled on Her Majesty for life, is 385,000*l.* per annum, payable quarterly, of which 60,000*l.* is assigned for Her Majesty's privy purse. The sovereign is empowered to grant pensions, to the amount of 1200*l.* per annum, to those who by their services or discoveries, have merited the gratitude of their country.——CIVIL WAR, a war between people of the same state, or citizens of the same city.——CIVIL YEAR, the legal year, or that form of year which each nation has adopted for the computation of time. The civil year in England and other countries of Europe consists of 365 days for the common, and 366 for leap year.

CIVIL'IAN (same *deriv.*), a doctor or professor of the civil law; or, in a more extended sense, one who is versed in law and government.

CLAIR'VOYANCE (clear sightedness: *Fr.*), a peculiar mode of sensation, or second sight, brought on when the patient is supposed to be in what is called the *mesmeric trance*, or *artificial catalepsy*. The reality of this state has been much disputed; and it is certain that great imposture has been practised in simulation of it.

CLAMP (*klammer*, from *klammern*, to hold fast: *Germ.*), in general, something that fastens or binds; as a piece of iron screwed on the corners where boards meet, &c.——In brick-making, a pile of bricks, arranged for burning, in which the end of one is laid over another, and a space is left between them for the fire to ascend.——In ship-building, a thick plank on the inner part of a ship's side, used to sustain the ends of the beams.—— In joiner's work, a piece of board fastened across the end of another.

CLAN (*clann*, descendants: *Gael.*), a family or tribe, living under one chief. This appears to have been the original condition of the savages of northern Europe. All the members of a clan held their lands of the chief, followed him to war, and were expected to obey him in peace. It is probable that, in time, several clans united into one: the name of the whole henceforward being that of the most powerful or the most respected portion.

CLAR'ENCIEUX, the second king-at-arms, an officer in Herald's College. Lionel, third son to Edward III., having by his wife the honour of Clare, in the county of Thomond, was declared duke of Clarence. But this dukedom afterwards escheating to Edward IV., he made its herald king-at-arms. The office of this functionary is to marshal and arrange the funerals of all baronets, knights, and esquires on the south side of the Trent.

CLAR'ENDON, CONSTITUTIONS OF, certain ecclesiastical laws drawn up at Clarendon, near Salisbury, A.D. 1164. They were sixteen in number, and all of them tended to restrain the power of the pope and clergy. The prelates and barons readily assented to them, except Archbishop Becket, who opposed them at first, but was afterwards prevailed upon to sign them. Pope Alexander III., however, annulled most of them.

CLARE-OBSCURE (*clarus*, clear; and *obscurus*, obscure: *Lat.*). [See CHIARO-SCURO.]

CLAR'ICHORD, or CLAV'ICHORD (*clavis*, a key; and *chorda*, a musical string: *Lat.*), an instrument of music, in the form of a spinnet. It is now out of use, all such instruments having been superseded by the pianoforte.

CLARIFICA'TION (*clarificatio*: from *clarus*, clear; and *facio*, I make: *Lat.*), the process of clearing or fining any fluid from all heterogeneous matter or fæculence. It is often effected by involving the matters producing turbidity in some other, which causes them to be so heavy as to sink down. Coffee is cleared with isinglass by this method. It differs from filtration, which is merely a straining through paper, cloth, &c.

CLAR'ION (*clarus*, clear: *Lat.*), a kind of trumpet whose tube is narrower, and its tone more acute and shrill, than that of the common kind.

CLASS (*classis*, a division: *Lat.*), a term applied in the scientific distribution of any subject. Classes are *natural* or *artificial*, according as they are founded on natural relations or resemblances, or are formed arbitrarily.

CLAS'SICAL (*classicus*, a citizen of the first class: *Lat.*), a term signifying excellent or of the highest order. It is said to owe its origin to the division of the Roman people into classes, the first of which was called, by way of eminence, the *classic*. The word *classical* is also applied to authors of standard authority, and particularly to the chief writers among the Greeks and Romans.

CLAUSE (*clausula*, from *claudo*, I shut: *Lat.*), in Law, an article in a contract or other writing: a distinct part of a contract, will, agreement, charter, &c.——In Grammar, a subdivision of a sentence, in which the words are inseparably connected with each other in sense, and cannot with propriety be separated by a point.

CLAUS'TRAL (*claustra*, an enclosure: *Lat.*), relating to a cloister or religious house; as a *claustral* prior.

CLA'VATE (*clava*, a club: *Lat.*), in Botany, an epithet for parts of plants which are club-shaped, or grow gradually thicker towards the top.

CLAV'ICLES (*clavicula*, a *dim.* of *clavis*, a key: *Lat.*), in Anatomy, two bones situated transversely and a little obliquely opposite to each other, at the superior and anterior part of the thorax, between the scapula or shoulder-bone, and the sternum or breast-bone.

CLAY (*klay: Teut.*), a species of earth which is firmly coherent, weighty, compact, and hard when dry, but stiff, viscid, and ductile to a great degree when moist: smooth to the touch, not easily diffusible in water, and when mixed with it not readily subsiding from it. Clays become soft by absorbing water, but so tenacious as to be capable of being moulded into any shape: and hence they are the materials of bricks, pottery-ware, &c. They consist essentially of alumina, with variable quantities of silica.

CLE'AVAGE (*kleben*, to cleave: *Germ.*), in Mineralogy, a term used in relation to the fracture of minerals which have natural joints and possess a regular structure.

CLECHE, in Heraldry, a kind of cross, charged with another cross of the same figure, but of the colour of the field.

CLEDGE, in Mining, a thin stratum of clay, or fuller's earth.

CLEF, or CLIFF (*clef*, a key: *Fr.*), a character, in Music, placed in the beginning of a stave, to determine the degree of elevation occupied by that stave in the general claviary or system, and to point out the name of the notes which are in the line of that clef.

CLE'MATIS (*Gr.*, from *klēma*, a vine twig, because it climbs trees with its slender twigs), a genus of climbing shrubs, nat. ord. *Ranunculaceæ*, including *Virgin's Bower* and *Traveller's Joy*, the latter a wild plant in English hedges, the *Clematis Vitalba* of botanists.

CLEPSAM'MIA (*klepto*, I steal; and *psammos*, sand: *Gr.*), an ancient instrument for measuring time by sand, like an hour-glass: it obtained its name from the *stealthy* motion of the sand.

CLEPSY'DRA (*klepsudra:* from *klepto*, I steal; and *hudor*, water: *Gr.*), a Roman and Grecian time-piece, or water-clock: an instrument to measure time by the fall of a certain quantity of water. [See CLEPSAMMIA.]

CLERE'STORY, a row of windows in a Gothic church above the arches of the nave and choir.

CLER'GY (*kleros*, literally an inheritance: *Gr.*, because clerics were supposed to take the 'portion of the Lord' as their inheritance), a general name given to the body of ecclesiastics of the Christian church, in distinction from the laity. Ethelwulf, in 855, gave the Anglo-Saxon priests a tithe of all the goods, and a tenth of all the lands in England, free from all secular services, taxes, &c. The charter in which this was granted to them was confirmed by several of his successors; and William the Conqueror, finding the bishoprics so rich, made them baronies, each of which contained at least thirteen knights' fees.

CLERK (*klerikos*, from same *deriv.*), a word originally used to denote a learned man, or man of letters. The term afterwards came to be appropriated to ecclesiastics. In legal documents the clergymen of the Church of England are styled clerks to this day.

CLEW'-LINES, and CLEW'-GARNETS, in Marine language, a sort of tackle fastened to the clews of the sails, to truss them up to the yard.

CLI'ENT (*cliens, Lat.*), a person who seeks advice of a lawyer, or commits his cause to the management of one, either in prosecuting a claim, or defending a suit in a court of justice.——Among the Romans, a citizen who put himself under the protection of a man of distinction and influence called his *patron*.

CLIMAC'TERIC (*klimakterikos*, from *klimax*, a ladder: *Gr.*), in Astrology, a critical year or period in a person's life. The superstitious distinction of years is said to have originated in the doctrines of Pythagoras. According to some, every seventh year is climacterical; but others allow only those years produced by multiplying 7 by the odd numbers 3, 5, 7, 9, to be such; for these, they say, bring with them some remarkable change with respect to health, life, or fortune: the grand climacteric is the sixty-third year.

CLI'MATE (*klima*, the slope of the earth from the equator towards the pole; *Gr.*), in a popular sense the term *climate* is given to any country or region differing from another in the temperature of the air, or with respect to the seasons, without any regard to the length of the days, or to geographical position. Thus we say a warm or cold climate, a genial climate, &c. Climate depends chiefly on distance from the equator, and height above the level of the sea: but the effect of these is greatly modified by other circumstances, such as the configuration and extent of the country, its inclination and exposure, the direction of the chains of mountains by which it is intersected, or which are in its neighbourhood, the nature of its soil with reference to radiation and evaporation, its distance from the sea, the action of winds having the temperature of different latitudes, the quantity of forest land, and the degree of cultivation. The diminution of forest and increase of tillage have, since the time of the ancient Romans, improved the climate in the neighbourhood of the Rhine, which is not now, as formerly, intensely frozen during winter.

CLI'MAX (*klimax*, a ladder: *Gr.*), a figure in Rhetoric, consisting of an assemblage of particulars, rising, as it were, step by step. The word is sometimes erroneously employed instead of *acme*, the highest step of the climax. An *anticlimax* is a descent. For an accidental example, see the article ELYSIAN FIELDS.

CLIN'ICAL (*klinikos*, from *klinē*, a couch: *Gr.*), in its literal sense, anything pertaining to a bed. Thus, a *clinical lecture* is a discourse from notes taken at the bedside of a patient by a physician, with a view to practical instruction in the healing art. *Clinical medicine* is the practice of medicine on those in hospital or in bed. And the term *clinic convert* was applied by the ancient ecclesiastical historians to one who received baptism on his death-bed.

CLINOM'ETER (*kline*, a bed; *metron*, a measure: *Gr.*), an instrument employed by geologists and miners for ascertaining the strike and angle of dip of stratified rocks.

CLOA'CA (a common sewer: *Lat.*), the sewer of ancient Rome. It was constructed before the establishment of the republic, of immense blocks of stone, in such a solid manner, that it remains to the present day, and continues to fulfil the purpose for which it was intended. It was so spacious that a wagon loaded with hay might pass through it.——This name is applied also to the excrementitious cavity, in birds, &c.

CLOCK (*cloche*, a bell: *Fr.*), a machine for measuring time. Its invention has been attributed to Pacificus, archdeacon of Verona, in the 9th century; and even to Bœthius, in the early part of the 6th. The first clock made in England was constructed about the year 1288, and remained until the time of Elizabeth. The most ancient clocks, of which we have any distinct account, were that erected in a tower of the palace of Charles V. of France, about the year 1364, and that made at Strasburg about the year 1370. In the following century public clocks became very common in Europe. The first method used for regulating clocks was by a *fly-wheel;* but this, being affected by the variable resistance of the air, acted very imperfectly. The great improvement in clockmaking was the application of the *pendulum* in the 17th century; but it is uncertain by whom it was first employed. Some attribute it to Galileo, who first announced its isochronism; and others to Huygens, who first explained its principle. The compensation pendulum was invented by Hooke in 1715; and the method of compensation by the unequal expansion of different metals by Graham. A clock consists of wheels moved by weights, and is so constructed that, by a uniform vibration of a pendulum, the hours, minutes, and seconds are measured with great exactness; and it indicates the hour, not only by a dial, but by the stroke of a hammer on a bell. Sometimes, also, it strikes the half-hours and quarters. The clock measures 24 *mean* hours, but the solar day is of various lengths, according to the situation of the earth in its orbit, and to the declination of the sun. Hence the clock is sometimes a few minutes faster or slower than the sun.

CLOIS'TER (*cloître: Fr.;* from *claustrum*, an enclosure: *Lat.*), part of a regular monastery, consisting of an arcade or colonnade, surrounding an open court. It served for exercise in wet weather, and sometimes for the transcription of books, &c. The word is used also to signify the convent itself. In a general sense, *cloisters* mean covered passages, such as were formerly attached to religious houses.

CLOTH (*clath: Ang. Sax.*), any kind of stuff that is woven or manufactured in the loom, whether made of wool, hemp, flax, or cotton.

CLO'THING. It has been very justly said that nothing is more necessary to a comfortable state of existence than that the body should be kept in nearly a uniform temperature. The chief end proposed by clothing ought to be protection from the cold; and it never can be too deeply impressed on the mind (especially of those who have the care of children) that a degree of cold amounting to shivering cannot be felt under any circumstances without injury to the health, and that the strongest constitution cannot resist the benumbing influence of a sensation of cold constantly present, even though it be so moderate as not to occasion immediate complaint, or to induce the sufferer to seek protection from it. Such a degree of cold often lays the foundation of the whole host of chronic diseases, foremost amongst which are found scrofula and consumption: and persons engaged in sedentary employments must be almost constantly exposed to it, unless the apartment in which they work is heated to a degree that subjects them, on leaving it, to all the dangers of a sudden transition, as it were, from summer to winter. The inactivity to which they are condemned, by weakening the body, renders it incapable of maintaining the degree of warmth necessary to comfort, without additional clothing or fire. To heat the air of an apartment much above the ordinary temperature of the atmosphere, we must shut out the external air; and the air within becoming extremely rarefied and dry, it is doubly dangerous to pass from it to the cold, raw external air. But in leaving a moderately warm room, if properly clothed, the change is not felt; and the full advantage of exercise is derived from any opportunity of taking it that may occur. The only kind of dress that can give the protection required by the changes of temperature to which high northern climates are liable, is *woollen;* and those who would receive the advantage which the wearing of it is capable of affording must place it next the skin; for it is in this situation only that its health-preserving power can be felt. The great advantages of woollen cloth are briefly these:—the readiness with which it allows the escape of the matter of perspiration through its texture; its power of preserving the sensation of warmth to the skin under all circumstances, from the slowness with which it conducts heat; and the softness, lightness, and pliancy of its texture. *Cotton cloth* must be esteemed the *next best* material of which clothing can be made; but *linen* is the *worst* of all the substances in use.

CLOUD, a collection of vapour suspended in the atmosphere; a congeries of watery particles, arising in the first instance by evaporation from the land and seas, and afterwards condensed into a visible shape. Clouds are of various kinds, according to their peculiar form, or the quantity of electric fluid they contain. Massive round clouds, increasing upwards from a horizontal base, are termed *cumulus* (*cumulo*, I heap up: *Lat.*); horizontal layers, which include fogs and mists, are termed *stratus* (*stratus*, scattered: *Lat.*); and fibres or curling streaks, which diverge in all directions, are termed *cirrus* (*cirrus*, a lock of hair: *Lat.*). From these are formed four other varieties, the *Cirro-cumulus*, the *Cirro-stratus*, the *Cumulo-stratus*, and the *Cumulo-cirrostratus*, or nimbus (*nimbus*, a sudden shower: *Lat.*), into which the others resolve themselves when rain falls. The compound names of these clouds sufficiently indicate their nature. It is probable that, when the watery vapour is separated by decreased temperature from the air in which it is dissolved, it becomes highly electrical, in accordance with one of the electrical laws; and that this state of electricity, by its repulsive tendency, keeps the aqueous particles from uniting suddenly and forming heavy rain. When this electricity is gradually dissipated, or suddenly during thunderstorms, rain falls. Clouds are likewise screens interposed between the earth and the scorching rays of the sun, which are often so powerful as to destroy the more tender vegetables.

CLOVE, a very pungent aromatic Indian spice; the unexpanded flower-bud of the *Caryophyllus aromaticus*, a tree twenty feet high, belonging to the myrtle order, and growing in the Moluccas.

CLO'VER, the common name of leguminous plants belonging to the genus *Trifolium*. They are also called trefoil. Red clover is generally cultivated for fodder, and for enriching land. White clover is an excellent food for cattle, and the bee collects no small amount of honey from its flowers.

CLYS'TER (*klŭstĕr*, from *kluzo*, I wash: *Gr.*), in Medicine, a liquid substance injected into the lower intestines, usually for the purpose of promoting alvine discharges, but sometimes for the support and nourishment of patients who cannot swallow aliment.

COACH (*coche*, a caravan: *Fr.*), a vehicle of pleasure, distinguished from others, chiefly by being a covered box hung on springs. The oldest carriages were used by the ladies in England, and were termed *whirlicotes*: we find that the mother of Richard II., who, in 1360, accompanied him in his flight, rode in a carriage of this sort. But coaches, properly so called, were introduced into England from Germany, or France, in 1580, in the reign of Elizabeth. In 1601, the year before the queen's death, an act was passed to prevent men from riding in coaches, as being effeminate: twenty-five years afterwards, however, hackney-coaches were in use.

COAD'UNATE (*coaduno*, I join together: *Lat.*), in Botany, an epithet for several leaves united at the base.

COAL, a solid inflammable mineral substance, capable of being used for fuel. There are several kinds, the principal being anthracite, true coal, lignite, and bituminous shale. Of these, true coal is the most abundant and most valuable. There are many varieties of it, from steam coal, which approaches anthracite, to jet, which some consider a variety of lignite. Analysis shows that it is composed of carbon and hydrogen, with oxygen, nitrogen, and sulphur, combined with an earthy basis, which, when burnt, forms ash. Steam coal has little hydrogen, and it is useless for gas-making. The coals best suited for this are deficient in heating power: such is Cannel coal. Coal is found in the Liassic and Oolitic members of the secondary formation, but chiefly in the carboniferous beds which derive their name from this circumstance. These belong to the Primary or Palæozoic formation. There are very large deposits of it in these beds in England, Wales, and Scotland; in Belgium, Prussia, France, and Spain. The coal fields of North America are of enormous extent. It has been ascertained, by the aid of the microscope, that coal consists almost entirely of vegetable remains, and from the class of plants discovered, it has been inferred that they grew in a warm damp climate. The manner in which these deposits were brought together and fossilised, has been much discussed by geologists, but the difficulties of the question are not yet cleared away. The total area of the English and Welsh coal fields is estimated at 3,000 square miles, and the Scotch coal fields comprise a further area of 1,600 square miles. Notwithstanding this extent, such is the large quantity excavated, and so great is the waste, that apprehensions are entertained of their being worked out within a short period. In 1862, there were 3,088 collieries in Great Britain, and in the preceding year about 235,600 colliers were employed. The quantity of coals produced and sold in 1862 amounted to 84,500,000 tons, and the coals exported the same year amounted to 7,670,000 tons. The most remarkable mines in our island are those of Whitehaven and Newcastle. The former are worked under the sea; the latter have been excavated to the depth of 1,500 feet.

COAT, in Anatomy, the membranous cover of any part of the body: as the coats of the eye, the stomach, &c.—COAT OF ARMS, in the modern acceptation, a device, or assemblage of devices, supposed to be painted on a shield, which, in the language of heraldry, is called the *field*.—COAT OF MAIL, armour made in the form of a shirt, and consisting of a kind of network of iron rings.

COATI-MONDI, a carnivorous animal, with a long snout, belonging to the bear family, and nearly allied to the racoon. It is a native of Brazil and Central America, and is called by naturalists *Nasua rufa*.

COAT'ING, in Chemistry, what is used for the purpose of defending certain vessels from the immediate action of fire; thus, the inside of some furnaces is covered with fire-clay, &c.

COBALT' (*kobold*, a devil: *Germ.*), a metal thus named by the miners, before its value was known, and when it was hated, on account of its presence being considered unfavourable to that of other metals. It is of a greyish-white or reddish-grey colour, is very brittle, and easily reducible to powder. It is strongly magnetic, and has a specific gravity of 8·5. It requires a high temperature to melt it. Its equivalent is 29·5. It is never found in a pure state, but usually as a metallic oxide, combined with a large quantity of arsenic. The impure oxide of cobalt is called *zaffer*; but when fused with three parts of silicious sand and an alkaline flux, it is converted into a blue glass, called *smalt*. This metal is used principally to give a permanent blue colour to glass, and enamels. The chloride of cobalt in solution affords a blue sympathetic ink. Characters written with this ink are invisible until exposed to heat. If the paper is laid aside for some time, the writing will again disappear.——**Cobalt Bloom**, acicular arseniate of cobalt. ——**Cobalt Crust**, earthy arseniate of cobalt.

CO'BRA DE CAP'ELLA (the hooded cobra: *Port.*), the *Naja tripudians* of naturalists, a very venomous snake of India, which, when irritated, puffs out its neck in the form of a hood, and this is marked with a streak resembling a pair of spectacles.

CO'CA, the native name of a tree (the *Erythroxylon coca* of botanists), the leaves of which when dried, powdered, and mixed with chalk or the ashes of other leaves, are chewed by the inhabitants of Peru and parts of Brazil, upon whose nervous system they produce such a stimulating effect that they are rendered capable of continued laborious work, without taking food, to an extraordinary degree.

COC'COLITE (*kokkos*, a kernel; and *lithos*, a stone: *Gr.*), in Mineralogy, a variety of *augite* or *pyroxene*. It is of a greenish hue, and is composed of granular concretions.

COC'CULUS IN'DICUS, an Indian berry, the fruit of a climbing shrub belonging to the genus *Anamirta*, nat. ord. *Menispermaceæ*. A preparation of it is said to be employed in communicating a narcotic quality to intoxicating drinks. A few handfuls of it, ground to a coarse powder, and thrown into a fish pond, will in a few hours bring the fish to the surface in a poisoned or intoxicated state; but putting them into fresh water recovers them. A poisonous principle called picrotoxine has been extracted from cocculus indicus.

COC'CUS (*kokkos*, the kermes berry: *Gr.*—what was considered by the ancients a *berry*, is now known to be an *insect*), in Entomology, a genus of homopterous insects, of which only the male has wings. One of the species affords the cochineal of commerce. Other species infest valuable plants to such an extent, forming what gardeners call *scale*, that great injury is done to them. [See Cochineal and Kermes.]

COC'CYX (*Gr.*), the lowest portion of the vertebral column, which in man consists of four small bones soldered together. They form the rudiments of a tail. The upper end joins the sacrum. [See Vertebræ.]

CO'CHINEAL (*cochenille*: *Fr.*, from *coccineus*, of a scarlet colour: *Lat.*), the *Coccus Cacti* of entomologists, an insect which in hot countries feeds upon various species of cactus. It has a plump wrinkled body, and somewhat resembles a seed cut in two. The female, after selecting a spot on a juicy leaf, thrusts in its beak and there remains sucking for the remainder of its life. Plantations of cactus are made for them, to which the insects are carefully removed when young. When fully grown they are brushed off, and killed either in a hot oven or by boiling water. Cochineal is employed for dyeing scarlet and crimson, and carmines and lakes are prepared from it. It takes about 70,000 insects to make up a pound weight. In some years 1400 tons of cochineal have been imported; but the demand has much lessened of late, in consequence of the introduction of the dyes of aniline.

COCH'LEA (*kochlias*, a snail: *Gr.*), in Anatomy, a portion of the internal ear; so called from its shape in mammals, being similar to that of a snail's shell.

COCHLEA'RIA (*cochleare*, a spoon: *Lat.*, from their leaves being hollowed out, like the bowl of a spoon), in Botany, a genus of plants, nat. ord. *Cruciferæ*. The species chiefly consist of various kinds of *scurvy grass*.

COCKATOO'S, a tribe of parrots forming the *Cacatuinæ* of ornithologists. They possess beaks that are much curved, and crests on the head which they can elevate or depress at pleasure. The white cockatoos, which are sometimes brought alive to this country from India and Australia, belong to the genus *Cacatua*.

COCK-CHA'FER, known also by the name of *May-bug*, a species of coleopterous insect. It is the *Melolontha vulgaris*, and is remarkable for the length of time it continues in the grub or larva state, as also for the injury it does to vegetation. It lives only about a week in the perfect state; but the grub remains in the earth for three years before it is transformed into the perfect insect, and, in the mean time, is very destructive to the roots of plants. Each female produces about two hundred eggs.

COCK'-PIT, in ships of war, an apartment situated near the after hatchway, under the lower gun-deck, in which wounds are dressed. The fore cock-pit, when there is one, is a place leading to the magazine passage and the store-room of the boatswain, gunner, and carpenter.

COCK'-ROACH, a name given to orthopterous insects of the genus *Blatta*. The *B. orientalis* is the 'black beetle' of our houses, an insect which is very active by night, when it devours whatever food may lie in its way: it is also very destructive to woollen cloths, &c.

COCK'SWAIN (contracted into *coxon*), an officer who has charge of the boat belonging to a ship, and the boat's crew.

COCK'ET, a seal belonging to the custom-house: likewise a scroll of parchment, sealed and delivered by the officers of the custom-house to merchants, as a proof that their merchandise is entered.

COC'KLE (*coquille*, a shell: *Fr.*), the common name of marine shell-fish belonging to the genus *Cardium*, several species of which are known on our coasts.

CO'COA, a palm tree, the *Cocos nucifera* of botanists. It grows in both the East and West Indies, is about sixty feet in height, and produces a fruit called the cocoa-nut. The shell of the latter is a woody substance; it contains a white fleshy kernel and a sweet refreshing liquor. These nuts, which are from three to seven inches long, hang in clusters on the top of the tree; their kernels yield a considerable quantity of oil, which is now made available in the manufacture of candles and soap; and the filaments of their outer coat are made into cables. If the body of the tree be bored there exudes from the wound a white liquor called palm wine or toddy. The leaves are wrought into sacks, hammocks, &c. The Cingalese have a saying that this tree serves for ninety-nine known things, the hundredth, man is not able to discover.——COCOA, more correctly CACAO, the chief ingredient in chocolate, is obtained from a small tree growing abundantly in Demerara and the region of the Amazons. This is the *Theobroma cacao*, which is allied to the baobab and silk cotton trees, nat. ord. *Byttneriaceæ*. The fruit has an oblong form, and is about five inches long. It grows from the stem and larger branches. Within a hard shell lie the oily seeds, nestling in white pulp, and these being dried, are manufactured into chocolate.

COCOO'N, the fibrous case which some caterpillars weave around themselves, when they assume the pupa or chrysalis form. The threads being unwound afford the silk of commerce.

COD, or COD'-FISH (*codde: Sax.*), the English name of the *Morrhua vulgaris*, one of the most valuable of fishes. The abdomen is thick and prominent; the head and eyes are large. It has dusky fins, the dorsal and anal being rather large, the pectoral and ventral rather small. The upper jaw is longest, and the lower is bearded at the tip by a single cirrus. It inhabits the northern seas, particularly the banks of Newfoundland, and sometimes attains a very large size.

COD'-LIVER OIL, an oil which is obtained from the liver of the cod-fish, and has lately acquired much reputation for its remedial powers. It is used in the dose of a tablespoonful three or four times a day, in pulmonary phthisis, in various scrofulous affections, in chronic gout and rheumatism, and in some skin diseases.

CODE (*codex*, a book: *Lat.*), a collection or system of laws. The collection of laws and constitutions made by order of the Emperor Justinian is termed a *code* by way of eminence.——The *Code Napoleon*, or *civil code* of France, drawn up during the government of Napoleon, effected great changes in the laws of France.

COD'ICIL (*codicillus*, a *dim.* of *codex*, a book: *Lat.*), a supplement to a will, containing anything which the testator wishes to add, or any explanation, alteration, or revocation of what his will contains.

COEFFI'CIENTS, in Algebra, such numbers, or given quantities, as are put before letters, or unknown quantities, as multipliers: thus, in $3a$, bx, and cxy, 3 is the coefficient of a, b of x, and c of xy.

CŒ'LIAC (*koilia*, the belly: *Gr.*), an epithet for what pertains to the belly, or the intestinal canal. Thus, the *cœliac artery* is that artery which issues from the aorta just below the diaphragm; the *cœliac vein* is a vein of the *intestinum rectum*; and *cœliac passion* is a flux or diarrhœa of undigested food.

CŒ'NA (*Lat.*), the principal meal among the Greeks and Romans. The time of the *cœna*, or supper, was the ninth hour, answering to three o'clock in the afternoon with us; and it usually consisted of three courses. A libation was made both before and after it; and the evening was concluded with much festivity.

COF'FEE TREE, an evergreen shrub, growing in Arabia, the West Indies, and Ceylon. It is the *Coffea Arabica* of botanists, nat. ord. *Cinchonaceæ*. It is seldom more than sixteen or eighteen feet high: the flowers are of a pure white, and the berries red when ripe. The use of coffee is said to have been introduced into England in 1652. What is called Mocha coffee, from Arabia Felix, is accounted the best; but that of Java, Bourbon, and the West Indies, is what we usually obtain, and constitutes an important article of commerce.

COF'FER (*coffre: Fr.*), a chest or trunk. ——In Architecture, a square depression or sinking in each interval between the modillions of the Corinthian cornice.——In Fortification, a trench cut in the bottom of a dry ditch.——In Mineralogy, a trough in which tin ore is broken to pieces.

COF'FER-DAM, in Bridge-building, a water-tight case of piling, fixed in the bed of a river, for the purpose of rendering dry the place on which a pier is to be erected; and sometimes the enclosure is double, clay being rammed in between. When finished, the water is pumped out of it, and the pier is built up inside.

COF'FIN, in the Veterinary art, the whole hoof of a horse's foot above the coronet.

COGNA'TION (*cognatio*, relationship by birth: *Lat.*), in Civil Law, natural relationship, or that line of consanguinity which is derived through either males or females, descended from the same father; in opposition to *agnation*, which is derived through males only.

COG'NIZANCE (*connaissance: Fr.*; from *cognitus*, known: *Lat.*), in Law, the hearing of a thing judicially. Also, the acknowledgment of a fine.——COGNIZANCE OF PLEAS, a privilege granted by the king to a city or town, to hold pleas of all contracts, &c.

COGNO'MEN (*co-gnomen: Lat.*), the surname or family name among the Romans. Thus, in Publius Cornelius Scipio, Publius is the *prænomen*, Cornelius the *nomen*, and Scipio the *cognomen*.

COGNO'VIT (he has confessed: *Lat.*), in Law, a writing by which the defendant admits that the plaintiff's cause of action against him is just; and suffers judgment to be entered against him without trial. Cognovits must be witnessed by the defendant's attorney.

COHE'SION (*cohæreo*, I adhere to: *Lat.*), as distinguished from *adhesion*, in Natural Philosophy, is that species of attraction which, uniting the particles of homogeneous bodies, retains them in the same mass. It depends on the amount of cohesion, whether a body shall be in a solid, liquid, or gaseous state. The attraction of cohesion acts only at exceedingly small distances

COHOBA'TION, in Chemistry, the operation of repeatedly distilling the same liquor, or returning it back again upon the same substance, and redistilling it.

CO'HORT (*cohors: Lat.*), a military body among the Romans, consisting of the tenth of a legion, or from three to six hundred men. The *Prætorian cohort* was a body of picked troops who attended the general: it was first formed by Scipio Africanus. The *Prætorian cohorts* were established by Augustus, in imitation of the Prætorian cohort; and were intended to protect his person. They were originally 10,000 men, but Vitellius increased the number to 16,000.

COIF (*coiffe*, a hood: *Fr.*), the badge of serjeants-at-law, who are called serjeants of the coif, from the lawn coif they wear under their caps, when they are created serjeants.

COIN (*Fr.*), a piece of metal stamped with certain marks, and made current at a certain value. Strictly speaking, coin differs from money, as the species differs from the genus. Money is any matter, whether metal, paper, beads, shells, &c., which has currency as a medium in commerce. Coin is a particular species always made of metal, and formed by a process called coining. The British *coinage* of gold and silver is wholly made at an establishment called the Mint, near the Tower of London. [See MINT.]

COINDICA'TION (*co*, along with; and *indicatio*, a pointing out: *Lat.*), in Medicine, a sign or symptom, which, with other signs, assists to show the nature of the disease, and the proper remedy.

COIR, a fibrous material, formed from the husk of cocoa-nuts. It is used for making ropes, matting, &c.

COL'CHICUM (*Lat.*; from *Colchis*, in Armenia, where it is said to have abounded), *Meadow Saffron*, a herbaceous plant, which grows in various parts of Europe. It belongs to the nat. ord. *Melanthaceæ*. Preparations of it are used as a remedy for the gout.

COL'COTHAR (*Arab.*), called also *Crocus Martis*, an impure brownish-red oxide of iron, which remains after the distillation of the acid from sulphate of iron, and is used in polishing glass and metals. The best sort of polishing powder, called *jeweller's red rouge*, or plate powder, is the precipitated oxide of iron.

COLD (*Sax.*). Great degrees of cold are produced by mixing together substances which dissolve rapidly. The reason of this will appear when it is recollected that in the conversion of solid bodies to fluids, caloric is always absorbed. Mixtures to produce artificial cold are generally made by mingling salt with snow, or with diluted acid and powdered ice. Ice has now become so much in request, either as a luxury or as a remedy, that various machines have been constructed for making it. [See ICE-MAKING MACHINES.]

COLEOP'TERA (*koleos*, a sheath; and *pteron*, a wing: *Gr.*), in Entomology, the order of BEETLES.

COL'IC (*kōlikos*, suffering in the colon: *Gr.*, from the part to which the pain is referred), an appellation given indiscriminately to almost all pains in the abdomen; but it is chiefly known as that disease which is characterized by a spasmodic sensation in the intestines, bilious vomiting, and obstinate costiveness.——PAINTERS' COLIC, a very painful and dangerous disease, arising from the absorption of lead into the system. Without proper attention it ends in emaciation, paralysis, and death.

COLISE'UM, an elliptical amphitheatre, at Rome, built by Vespasian. This unrivalled monument of ancient grandeur was 1612 feet in circumference, contained eighty arcades, and would hold 100,000 spectators. It was decorated with statues representing all the provinces of the empire; and in the middle stood that of Rome, holding a golden apple in her hand. Down to the thirteenth century, it remained almost uninjured; afterwards Pope Paul II. took all the stones from it, which were used for the construction of the palace of St. Mark; and in later times some other palaces were erected from its fragments. But Benedict XVI. caused a cross to be erected in the centre of the arena, where Roman Catholic worship is occasionally performed; and, at present, care is taken not to injure its venerable ruins. The great object of this magnificent building was to exhibit the brutal spectacles of the gladiators contending with wild beasts, &c. On the triumph of Trajan over the Dacians, 11,000 animals were killed in the amphitheatres at Rome; and 1000 gladiators fought during 123 days. The gladiators at first were malefactors who contended for victory and life, or captives and slaves, who were made to fight for their freedom; but after a time many lived by it as a profession; and these exhibitions continued, with modifications, for above 500 years.

COLLAP'SE (*collapsio*, from *collabor*, I shrink together: *Lat.*), to close by falling together, as the fine canals or vessels of the body *collapse* in old age, or as a balloon collapses when the gas escapes from it.——In Medicine, a sudden and great depression of its energy and strength.

COL'LAR (*collare*, from *collum*, the neck: *Lat.*), in Roman Antiquity, a chain put round the neck of slaves who had run away.——In a modern sense, it denotes an ornament for the neck, consisting of a chain of gold, frequently containing ciphers or other devices with a badge hanging in front, and worn by the knights of several military orders.

COLLAT'ERAL (*com*, along with; and *lateralis*, belonging to the side: *Lat.*), in Genealogy, a term applied to kindred with reference to other kindred, when they are younger children, or have descended from younger children of the same common ancestor; used in opposition to *lineal* descendants.——COLLATERAL SECURITY, in Law, security for the performance of covenants or the payment of money, given in addition to the principal security.

COLLA'TION (*collatio*, a bringing together: *Lat.*), in the Canon Law, the presentation to a benefice, by a bishop, who has it in his own gift or patronage. When the patron of a church is not a bishop, he presents his clerk for admission, and the bishop institutes him; but *collation* includes both presentation and institution.——COLLATION, in Law, the comparison of a copy with its original, to ascertain its conformity; or the report of the officer who made the comparison. Hence, a *collator* is one who compares copies or manuscripts. And by *collating*, among printers, is meant examining the whole number of sheets belonging to a book, to see if they are all gathered properly.

COL'LECT (*collectus*, from *colligo*, I collect: *Lat.*), a short comprehensive prayer, such as those appointed to be repeated before the epistles and gospels in the public service of the Church of England.

COLLECTA'NEA (*collectaneus*, gathered together; from the same: *Lat.*), in Literature, notes, observations, or any matter collected from a variety of works.

COLLEC'TIVE (*collectivus*, gathered together; from the same: *Lat.*), in Grammar, an epithet for any noun which comprehends many persons or things; as a *multitude*, a *company*, a *congregation*, an *army*, &c.

COL'LEGE (*collegium*, from *collega*, a companion: *Lat.*), in its usual, though somewhat limited sense, a public place endowed with certain revenues, where the several departments of learning are taught, and where the students reside, under a regular discipline. The schools in cathedrals and monasteries were confined chiefly to the teaching of grammar, and there were only one or two masters employed for that purpose: but in colleges, professors are appointed to teach all the branches of science. ——In the more extended signification of the word, the ancient Romans had colleges, which were a species of corporate body, as that of the *augurs*; and others whose members had no bond of union but that of a common occupation, as the *Collegia opificium* (colleges of workmen). And, in this country, many corporate bodies are termed colleges, which have little or no reference to education; thus the College of Physicians, the College of Heralds, &c.——In the Academical sense, a college is a society established for scholastic purposes, endowed with revenues, and subject to a code of laws. When one body imparts instruction in all the branches of knowledge, it is both a college and a university: thus, Trinity College, Dublin. On the other hand, a number of colleges, united under the same discipline, constitute a university. In such a case, while each college is governed by its own superiors, there are powers which are wielded by the university at large. As the Scotch universities have not a body of fellows and scholars receiving stipends, they are not in the strict sense colleges. When universities were first instituted, the students who came to them for instruction lodged where they pleased, and had no common bond of union, except that of study. Boarding houses were then established; and being ultimately endowed by munificent persons for the benefit of the students who were receiving instruction at the university, they became colleges. These consist of a head under some name, as *provost*, of a body termed *fellows*, who—as these institutions originally had reference to supplying the church with ministers—were not allowed to marry, and, lastly, of graduates, named scholars. Afterwards, members who did not share the benefit of the foundation, were allowed to reside within them, and were subjected to their rulers. Every student is under the care of some *tutor*, who is generally one of the resident fellows, to whom he is assigned in charge. The university confers degrees, &c., but each college prepares its students to receive them; and every member of the university must now belong to some college. Individual colleges sometimes impart instruction in every branch of knowledge—some of those, for example, belonging to the University of Paris. But even there the most important are devoted to special subjects; as that of the Sorbonne, to theology, &c. The oldest colleges in Oxford and Cambridge are supposed to have been founded about the middle of the 13th century.

COLLE'GIATE CHURCHES, those that, without being cathedrals, have, with the exception of the episcopacy, the dignitaries usually attached to such. Westminster Abbey is formally styled 'the Collegiate Church of St Peter's.'

COLLIMA'TION, LINE OF, in a telescope that which passes through the tube, and cuts both the focus of the eye-glass and the centre of the object-glass.

COLLIQ'UATIVE (*colliquesco*, I become liquid: *Lat.*), an epithet indicating a morbid discharge of the animal fluids; as a *colliquative* fever, which is accompanied with profuse sweating, &c.

COLLIS'ION (*collisio*, from *collido*, I dash one thing against another: *Lat.*), in Mechanics, the meeting or mutual striking of two or more bodies, one of which, at least, is in motion.

COLLO'DION (*kolla*, glue: *Gr.*), a solution in ether, containing a little alcohol, of xyloidin, a substance formed by treating starch, and other things of the same class, with nitric acid. On account of its adhesive properties it is employed in pharmacy, but its chief use is in coating plates of glass for photographic images. [See PHOTOGRAPHY.]

COLLU'SION (*collusio*, from *colludo*, I act in fraudulent union with: *Lat.*), in Law, an illegal compact between two or more persons.

COLLYR'IUM (*Lat.*; from *kollurion*: *Gr.*), in Medicine any fluid application for the eyes.

COLOBO'MA (*koloboo*, I shorten: *Gr.*), in Medicine, the growing together, or gluey adhesion, of the eyelids.

COL'OCYNTH, or COLOQUIN'TIDA (*kōlon*, the colon; and *kineo*, I move: *Gr.*), the *Bitter apple*. It is the fruit of a wild gourd (the *Citrullus Colocynthis* of botanists), the pulp of which is light, spongy, and white; and is remarkable for its intense bitterness. Coloquintida has been known in medicine from the earliest times as one of the most powerful cathartics: it is sent us from Syria, particularly from Aleppo.

COLOGNE-EARTH, a substance used in painting, of a deep brown colour, approaching amber. It is supposed to be a preparation of the remains of wood long buried in the earth.

CO'LON (*kōlon*, a member of anything: *Gr.*), in Anatomy, the greater or upper portion of the large intestine.——In Grammar, a point marked thus (:), and used to divide a sentence.

COLONEL (*Fr.*), the chief commander of a regiment, whether infantry or cavalry.

COLONNA'DE (*Fr.; from columna*, a column: *Lat.*), a range of pillars running along or quite round a building.

COL'ONY (*colonia*, from *colonus*, a husbandman: *Lat.*), a body of people removed from their mother-country to a distant region, where they form a settlement under the sanction of the home government.

COL'OPHON (something finished: *Lat.;* from *kolophōn*, the summit: *Gr.*), in Bibliography, the name given to the *postscript* in the last sheet of an early printed work, containing the printer's name, date, &c.

COL'OPHONITE (*kolophōnia*, resin: *Gr.*), in Mineralogy, a variety of garnet, of a reddish yellow or brown colour, occurring in small amorphous granular masses.

COLOPH'ONY (*kolophōnia: Gr.*, from a city of that name), black resin, or turpentine boiled in water and dried: or the residuum after the distillation of oil of turpentine.

COL'ORATURE (*coloratus*, variegated: *Lat.*), in Music, all kinds of variations, trills, &c., intended to heighten the effect of the melody, or show the skill of the vocalist.

COLOS'SUS (*kolossos: Gr.*), a statue of enormous or gigantic proportions. That to which this name has been specially applied was an Apollo in brass, upwards of 100 feet in height, erected at Rhodes, the workmanship of Chares, who devoted himself to it during twelve years. It was placed at the entrance of the harbour, with the right foot on the land at one side, and the left on that at the other; and is said to have stood nearly fourteen centuries before the period in which it fell by the shock of an earthquake. When the Saracens became possessed of Rhodes, they found it in a prostrate state, and sold it to a Jew, by whom 900 camels were laden with its materials. The largest colossus of modern times is that of S. Carlo Boromeo, on the Lago Maggiore. It is a hollow statue of bronze, nearly sixty feet in height.

COL'OUR (*color: Lat.*), in Physics, a property inherent in light, and not, as was formerly supposed, in the coloured substance. It arises from only a portion of the coloured rays, which form white light, being transmitted to the eye so as to produce sensation, the rest being absorbed or turned in a different direction by reflection or refraction. The principal colours are red, orange, yellow, green, blue, indigo, and violet. They are all reducible to *red*, *yellow*, and *blue*: and the others are formed by some combinations of these, as green by yellow and blue, orange by red and yellow, &c.; and all the colours admit of many shades of difference. White is not properly a colour, since a white body reflects the rays of light without separating them; nor black, since a black body, on the contrary, absorbs nearly all the rays. [See COMPLEMENTARY COLOURS.]——COLOURS, in Heraldry, the tinctures with which the field or any part of the escutcheon is distinguished: they are red, blue, black, green, and purple; which the heralds call *gules*, *azure*, *sable*, *vert*, and *purpure*. Tenne and tawny, or sanguine, are not so common. The yellow and white, called *or* and *argent*, are metals, not colours. The metals and colours are expressed in blazon by the names of precious stones, with reference to the arms of noblemen, and by those of planets or stars, with reference to the arms of royal personages.——COLOURS, in Military affairs, the banners, flags, ensigns, &c., of all kinds borne in the army or fleet.

COL'OURING, in Painting. The effect of a picture depends far more upon the way in which the colours are harmonized and contrasted than on the exact imitation of the real colours of objects. Painters use the word *hue* with reference to the peculiar quality of a colour, distinguishing it from another colour throughout all shades and variations, as green from purple. *Tint* signifies the degree of the intensity of hue from the greatest depth to the lightest wash. *Tone* means the degree of illumination or shade in which the hues and tints are seen. *Local* colour is the true colour of an object without regard to tone or tint. *Broken* colours are hues composed of several others, so as to make a mixture quite distinct from the prismatic red, blue, and yellow, and the typical browns, purples, and greens. Colouring, says Mrs. Jameson, is generally cold in Poussin, delicate in Guido, warm in Domenichino, glowing and golden in Titian, fervid and fiery in Giorgione, florid in Rubens, powerful in Rembrandt.

COLOUR TOP, a philosophical toy invented by Mr. John Gorham, for the purpose of showing the effect of mingling different colours. This is done by giving pieces of coloured paper a motion of rapid rotation.

COL'UBER (a snake: *Lat.*), in Zoology, a genus of snakes which includes the common or ringed snake of our island, *Coluber natrix*, a timid inoffensive animal.

COL'UMBINE (*columbinus*, dove-coloured: *Lat.*), the common name of plants belonging to the genus *Aquilegia*, nat. order *Ranunculaceæ*, a genus of plants of several species.——Also the chief female dancer in a pantomime.

COLUM'BIUM (from *Columbia* in America), the name of a very rare metal, sometimes called *Tantalum*, first discovered in a mineral from Massachusetts in North America. It has a grey colour. So far no use has been discovered for it.

COLUMEL'LA (the *dim.* of *columna*, a column: *Lat.*), in Botany, the central pillar in some capsules from which the valves separate when the fruit is ripe. In Conchology, the upright pillar in most univalve shells, round which the whorls twist.

COL'UMN (*columna: Lat.*), in Architecture, a cylindrical pillar, or long round body of wood, stone, or iron, which serves either for the support or ornament of a building. It consists of a capital, which is the top or head: a shaft, which is the cylindrical part; and a base, on which it rests. It differs from the *pilaster*, which is square. Columns are distinguished as to their form into the Tuscan, Doric, Ionic, Corinthian, and Composite. The Tuscan is characterized by being crude, simple, and massive; the Doric is next in strength and massiveness to the Tuscan; the Ionic is more slender than the Tuscan and Doric; the Corinthian is still more delicate in its form and proportions, and is enriched with ornaments; and the Composite is a species of the Corinthian. The proportions of a column are stated in terms of the radius of the bottom of the shaft, which radius is termed a module, and is divided into 30 equal parts called minutes. The Tuscan column has a total height of 14 modules, the capital and the base having each one module. The Doric column has a height of 16 modules, the base having one module, and the capital 32 minutes. The Ionic column has a height of 18 modules, the capital 21 minutes, and the base 30 minutes. The shaft may be plain or fluted: if the latter, it should have 20 or 24 flutings. This column is frequently used for porticoes. The Corinthian column has more delicacy and ornament than the others, the shaft being slender, and the capital rich. It is 20 modules in height, the base having one module and the capital 70 minutes. The shaft may be fluted. The capital is adorned with olive leaves. The Composite or Roman column has a height of 20 modules, the base having one module, and the capital 70 minutes. The shaft may be fluted.——The word COLUMN has also many other significations. Thus it means the division of a page, which may contain two or more *columns*; a large body of troops drawn up in order; any body of the same diameter as its base—thus, a *column* of water, air, or mercury.

COLUM'NA (a column: *Lat.*), in Anatomy, a term applied to different parts: thus the *columna nasi* is the lowest and fleshy portion of the nose, which forms a part of the septum; and the *columna oris* is the same with the uvula.

COLU'RES (*kolos*, clipped; and *oura*, a tail: *Gr.*), in Astronomy, two great circles supposed to intersect each other at right angles in the poles of the earth. They pass through the solstitial and equinoctial points of the ecliptic, and are hence called the *Solstitial* and *Equinoctial* colures. It is believed that this name was given to them on account of their lower parts being always cut off by the horizon.

CO'MA, or COMA-VIGIL (*kōma*, a lethargy: *Gr.*), a preternatural propensity to sleep, or lethargic drowsiness. It is a symptom which often attends acute and malignant fevers.——COMA SOMNOLENTUM, is when the patient continues in a profound sleep, and, if awaked, immediately relapses, without being able to keep his eyes open. ——COMA BERENI'CIS (*komē*, hair: *Gr.*), *Berenice's hair*, in Astronomy, a constellation of the northern hemisphere, composed of stars near the tail of Leo.——The word COMA also denotes the hairy appearance that surrounds a comet, when the earth is between it and the sun.

COMA'TULA (*comatus*, hairy: *Lat.*), a genus of marine radiate animals allied to the star fishes. In their young state they are attached by a jointed stalk to rocks, and they then resemble the PENTACRINUS. But when fully grown the stalk disappears, and a number of jointed legs, armed with claws, take its place. The animal consists of a central disk, in which is the mouth on the underside, and from which radiate five pairs of plumose arms, whence it has received the name of feather star. By the flapping of these arms it can move slowly through the water.

COMBINA'TION (*combinatio*, a joining two by two: *Lat.*), in its general and most popular sense, a league or association formed for good or bad purposes.——In Chemistry, the intimate union of two or more bodies, from which results a new compound differing in its properties from any of the constituents. Thus, an acid uniting with an alkali, forms a salt, and furnishes a good instance of combination.——COMBINATION, in Mathematics, the variation or alteration of any number of quantities, letters, sounds, or the like, in all the different manners possible.

COMBUS'TION (*combustio*, from *comburo*, I consume: *Lat.*), in Chemistry, a term which denotes the union of a supporter of combustion, which is generally the oxygen of the air, with a combustible substance, or its elements. When this combination is *energetic*, it is always accompanied by heat and light. In popular language, *combustion* is the effect of fire in apparently consuming anything and producing heat. It was formerly supposed that a body was annihilated either wholly or partially by combustion; but we now know that this mistake is due to the products of combustion being generally invisible. Of all bodies capable of being procured in large quantities, none throws off light so abundantly during its combination with oxygen as the elementary gas, hydrogen, when united to the elementary solid, carbon. This gas and solid may be combined in various proportions, and a combination of the same proportions will assume various external appearances, according to the varying conditions under which the union has taken place. The gas of our street lamps exhibits one form of the compound; the liquid oils that we burn in our lamps another form; and a third form of it is afforded by the solid fats which we obtain from a wide range of animal and vegetable substances.

COM'EDY (*kōmōdia*, from *kōmē*, a village: and *ōdē*, a song: *Gr.*), because the first comedies consisted of rustic dialogues), a dramatic representation of the light, humorous, and pleasant kind, particularly intended to ridicule the follies of men. Scaliger defines comedy to be a dramatic poem, representing the business of life, whose event is fortunate and style familiar. With us, comedy is distinguished from *farce*, as the former represents nature as she is, the latter distorts and overcharges her; but whether it be to recommed virtue, or to render folly ridiculous, the real intention and effect are amusement.

COM'ET (*komētēs*, from *komē*, hair: *Gr.*), in Astronomy, a nebulous star, accompanied with a train of light, and performing revolutions about the sun in an elliptical orbit, which has the sun in one of the foci. Several comets are suspected of describing parabolas and not ellipses, in which case they will never again visit our system. The head has usually a nucleus or denser part, surrounded by a faint light or nebulosity. Some comets have appeared without tails, whilst others have had several tails; that of 1744, for instance, had six, which spread out like a fan. These tails are frequently of extraordinary extent. The comet of 1680, one of the most celebrated of modern times, had a tail that was calculated at twenty millions of leagues immediately after its perihelion passage, and yet it was emitted in two days. It subsequently became more than twice as long. The matter of these tails must be of incalculable tenuity, and it is supposed that on account of the distance to which they are sent, much of it can never be reabsorbed. Even the heads of many comets are composed of matter of extreme thinness, for a star of the fifth magnitude was observed through the densest part of one without undergoing any diminution of lustre. 'The most unsubstantial clouds,' says Sir John Herschel, 'which float in the highest regions of our atmosphere, and seem at sunset to be drenched in light, and to glow throughout their whole depth as if an actual ignition without any shadow or dark side, must be looked upon as dense and massive bodies compared with the filmy and all but spiritual texture of a comet.'

COMETA'RIUM (*kometes*, a comet: *Gr.*) a machine constructed to represent the revolution of a comet about the sun.

COMETOG'RAPHY (*komētēs*, a comet; and *grapho*, I write: *Gr.*), a description of, or discourse upon, comets.

COM'FREY, the common name of *Symphytum officinale*, a wild herbaceous plant, nat. ord. *Boraginaceæ*, whose root abounds with a mucilaginous juice, which made it esteemed as an emollient.

COMITA'TIS CAUSA (on account of courtesy: *Lat.*). At the universities of Oxford and Cambridge, persons who are masters of arts, or bachelors, or doctors of civil law, medicine, or divinity, of one university, or of Dublin, may be admitted to the same degree at the other *comitatis causâ*.

COMI'TIA (*Lat.*: from *cum*, with; and *itus*, a going), in Roman Antiquity, an assembly of the people, either in the *Comitium*, or *Campus Martius*, for the election of magistrates, or consulting on the important affairs of the republic.

COM'MA (*komma*, a piece cut off: *Gr.*), in Grammar, a point or character marked thus (,), denoting the shortest pause in reading, and separating a sentence into divisions or members.——In Music, the smallest of all the subdivisions; being about the ninth part of a tone.

COMMANDANT' (*Fr.*), the commanding officer of a place, or of a body of forces.

COMMAN'DER (*commander*, to command: *Fr.*), the chief officer of an army, or one who has the command of a body of men. The Commander-in-Chief in the British army is he who has the supreme command over all the land forces in Great Britain. In the Naval service, the chief admiral in any port or station is so called.——The COMMANDER of a ship, in the Royal Navy, is an officer next in rank to a post-captain, and corresponds to a *major* in the army; he has the command of a ship of war under 18 guns, a sloop, &c.

COMMEN'CEMENT (a beginning: *Fr.*), an annual public assembly of the university of Cambridge; or the day on which degrees are publicly conferred.

COMMEN'DAM (*commendo*, I give in charge: *Lat.*), in Ecclesiastical Law, the trust or administration of the revenues of a benefice, formerly given to a layman to hold as a deposit for six months, in order to repair, &c.; or to an ecclesiastic to perform the pastoral duties till the benefice was provided with a regular incumbent. In England, the right of granting benefices *in commendam* was vested in the crown by a statute of Henry VIII. When a benefice was given *in commendam*, the profits ought not to have been received by the party to whom it was committed: the restriction on this point was, however, evaded, and it became a mode of enjoying pluralities. But no spiritual person can now hold two benefices, some few cases excepted; nor can a bishop hold any office, benefice, &c., in commendam.—— One who holds a living in commendam is called a *commendatory*. COMMENDATORY LETTERS, those sent from one bishop to another in behalf of any of the clergy, &c.

COMMEN'SURABLE (*com*, together with; and *mensurabilis*, measurable: *Lat.*), among Geometricians, an appellation given to such quantities as are measured by the same quantity; thus, a yard and a foot are commensurable, as both may be measured by inches.

COM'MENTARY (*commentarius*, from *commentor*, I meditate thoroughly: *Lat.*), an explanation of the obscure passages in an author; sometimes applied to an historical narrative, as the Commentaries of Cæsar.

COM'MERCE (*commercium*, from *commercor*, I traffic with: *Lat.*), in a general sense, the intercourse of nations for the purchase of each other's produce or manufactures, the superfluities of one being given for those of another, and then re-exchanged with other nations according to their several wants.

COMMISSA'RIAT (*commissaire*: *Fr.*; from *committo*, I entrust with: *Lat.*), the whole body of officers in the commissary's department.

COM'MISSARY (*Fr.*; same *deriv.*), in a general sense, one who is sent or delegated to execute some office or duty, as the representative of his superior.——In Military affairs, an officer who has the charge of furnishing provisions, clothing, &c., for an army.——In Ecclesiastical Law, an officer of the bishop who exercises spiritual jurisdiction in distant parts of the diocese.

COMMIS'SION (*commissio*, from *committo*, I give in charge: *Lat.*), in Law, the warrant, or letters-patent, by which one is authorized to exercise jurisdiction.——In Military affairs, the warrant or authority by which one holds any post in the army; in distinction from the inferior or non-commissioned officers.——In Commerce, the order by which anyone traffics or negotiates for another; also the percentage given to factors and agents for transacting the business of others.

COM'MISSURE (*commissura*, a joint: *Lat.*), in Anatomy, any suture or juncture, particularly the corners of the lips where they meet together, and also certain parts of the brain.

COMMIT'MENT (*committo*, I give in charge: *Lat.*), the sending a person to prison by warrant or order, either for a crime or contumacy.

COMMIT'TEE (same *deriv.*), certain persons elected or appointed, to whom any matter of business is referred, either by a legislative body, or by any corporation or society.——A Committee of Parliament signifies a certain number of members appointed by the house to proceed on some specific business. The whole house frequently resolves itself into a committee, in which case each member has a right to speak as often as he pleases. When the house is not in committee, each gives his opinion regularly, and is only allowed to speak once, unless to explain himself. *Standing committees* are such as continue during the existence of the parliament. *Select committees* are appointed to consider and report on particular subjects.

COMMOD'ITY (*commoditas*, advantage: *Lat.*), in Commerce, any merchandise in which a person deals.——Staple Commodities, such wares and merchandises as are the proper produce or manufacture of the country.

COM'MODORE, a captain in the British navy, who is invested with the temporary command of a detachment in some particular enterprise. In the North American navy, a commodore corresponds with our admiral.——The Commodore of a Convoy is the leading ship in a fleet of merchantmen, and carries a light in her top to conduct the other ships.

COM'MON (*communis: Lat.*), a tract of ground, or open space, the use of which is not appropriated to any individual, but belongs to the public, or to a number. The right which a person has to pasture his cattle on the land of another, to dig turf, catch fish, cut wood, or the like, is called *common* of pasture, of turbary, of piscary, and of estovers.

COMMON COUN'CIL, the council of a city or corporate town, empowered to make by-laws for the government of the citizens. The term is generally used in speaking of a court in the city of London, composed of the lord mayor, aldermen, and a certain number of citizens called common-councilmen. The city of London is divided into 24 wards; the chief magistrate of each ward has the title of alderman; the 24 aldermen, with the lord mayor, form the court of aldermen; and certain inhabitants, chosen out of each ward, for the purpose of assisting the aldermen with their advice in public affairs, form the court of *common council*.

COMMON LAW, the law that receives its binding force from immemorial usage, in distinction from the statute law.

COMMON-PLACE BOOK, one in which extracts from books and reflections are written.

COMMON-PLEAS', or COMMON BENCH, one of the superior courts at Westminster-hall. It was originally that branch of the *Aula Regia*, or King's bench, in which civil causes between subjects were tried, and, like that court, followed the person of the sovereign. But it was fixed by the charters, both of John and Henry III., that it should be held in a determined place. It has concurrent jurisdiction with the Queen's bench and Exchequer, the two other superior courts in personal actions and ejectments; but has no cognizance in criminal matters, nor in matters relating to the revenue. It has exclusive jurisdiction in such real actions as still exist, and over the forms of conveyance substituted for fines and recoveries; also in appeals from the decisions of the barristers appointed to revise the lists of parliamentary voters, as well as in cases under the railway and canal traffic act. It has one chief, styled Lord Chief Justice, and four puisne judges; and from their decisions, proceedings in error may be taken into the Exchequer Chamber.

COMMON PRAY'ER, the liturgy, or public form of prayer prescribed by the Church of England to be used in all churches and chapels, and which the clergy are enjoined to use, under a penalty.

COM'MONS (*communis*, common: *Lat.*), the lower house of Parliament, consisting of the representatives of cities, boroughs, and counties, chosen by those possessed of the property or qualification required by law. This body is called the *House of Commons*, and may be regarded as the basis of the British constitution. In the 15th year of King John, writs were issued to the sheriffs, commanding them to return four knights for each county 'ad loquendum cum rege de negotio regni' (to confer with the king concerning the affairs of the realm), at Oxford. And in the 48 Henry III. four knights, from every county but nine, were summoned to attend with the barons, by the rebellious Earl of Leicester. No subsequent writs, for the purpose of county elections, earlier than 18 Edward I., nor for borough elections earlier than the 23rd of the same reign, are in existence; but it is not unlikely that these examples were occasionally followed. Though each member is elected by a distinct body of people, he is, from the moment of his election, the representative not of those particular persons only, but of the kingdom at large; and is to consider himself not merely as the organ through which his constituents may speak, but as one who having been entrusted with a general charge, is to execute it to the best of his judgment. In performance of this great function, his liberty of speech is bounded only by those rules of decency of which the house itself is the judge; and while, on the one hand, he is free to propose what laws he pleases, on the other, he is exposed, as a private man, to the operation of the laws he makes. The acceptance of any office of profit from the Crown, by a member, vacates his seat. And there are two places of no profit, the acceptance of which is considered to have this effect:—the stewardship of the *Chiltern Hundreds*, and the stewardship of the *Manor of East Hendred*. Officers of the army and navy receiving new commissions, and those, such as ambassadors, who obtain a foreign employment, are excepted from this law. A member becoming a bankrupt is incapable of sitting or voting for a year, unless within that time the commission is superseded, or the creditors paid; and if either of these does not take place within the year, the seat is lost. By a resolution dated 1667, and now strictly adhered to, any proposition for taxing the subject must be first examined by a committee of the whole house, and their opinions reported. And when a bill of supply has received the concurrence of the Lords, it is returned to the Commons, and by them presented to the throne. The House of Commons consists of 658 members, 500 for England, 53 for Scotland, and 105 for Ireland. Though many small boroughs were disfranchised by the Reform Bill, the elective franchise was given to several places of rising importance; and a variety of alterations took place, by adding to the number of representatives of counties, &c., so that the total number of members remains the same. No one can vote on the election of a knight of the shire except he be seized of a freehold estate of inheritance of 40*s.* a year value, or of a freehold estate for life of 10*l.* annual value, or of a freehold estate for life of less value when he actually occupies the premises, and in some other cases, or of an estate other than freehold tenure of inheritance, or for life of the annual value of 10*l.*, or of a chattel interest of a certain value and duration in land. No one can vote in the election of a member for a city or borough unless he shall be the occupant of some building which, with or without land, has the yearly value of 10*l.*

COM'MONWEALTH, a free state or body politic.

COM'MUNISM. [See **Socialism.**]

COMMU'NITY (*communitas*, from *communis*, shared by several: *Lat.*), a society of people living in the same place, under the same laws and regulations, and who have common rights and privileges. History shows that the establishment of communities has been one of the greatest advances in human improvement; and they have been, in different ages, the cradle and the support of freedom.

COMMUTA'TION (*commutatio*, from *commuto*, I alter: *Lat.*), in Law, the change of a penalty or punishment from a greater to a less; as when death is commuted for transportation or imprisonment.

COM'PANY (*compagnie*: *Fr.*), in a commercial sense, a society of persons joined together for trading purposes. When companies do not trade upon a joint stock, but are obliged to admit any person properly qualified, upon paying a certain fine, and agreeing to submit to the regulations of the company, each member trading upon his own stock and at his own risk, they are called *regulated companies*; when they trade upon a joint stock, each member sharing in the common profit or loss, in proportion to his share in the stock, they are called *joint-stock companies*. These may be ordinary partnerships, in which each member is liable for the whole debts of the firm; or they may be companies with limited liability, registered under the Joint-Stock Companies' Act, 1862, which contains many provisions regulating these companies.——In the City of London are many associations, relics of old trading companies, of which twelve are known as the Great Livery Companies. Some of these are wealthy bodies, with fine halls, where splendid banquets are occasionally given. Before any person can hold office in the Corporation, he must be a member of some one of these companies. ——**Company**, in Military affairs, a small body of foot, consisting, in the guards and artillery, of 120 men; but in other infantry regiments, of 100, commanded by a captain, who has under him a lieutenant and ensign. A company, in the infantry, corresponds to a *troop* in the cavalry.——Also, the whole crew of a ship, including the officers.

COMPAR'ATIVE ANAT'OMY, is so called because in it the organization of all the members of the animal kingdom are studied with reference to each other. The objects in view are to trace the modifications and disappearance of different organs, in the descending series; to determine the relative degrees of complexity in the structure of different animals, and the points of resemblance which different species manifest to each other, in the totality of their organization; and to trace the history of the development of the embryo. The ultimate aim of comparative anatomy and physiology is to ascertain the laws of vital phenomena.

COMPART'MENT (*compartiment*: *Fr.*; from *compartior*, I divide: *Lat.*), in Architecture, a proportionable division in a building; or some device marked in an ornamental part of the building.——**Compartments**, in Heraldry, are partitions and quarterings of the escutcheon, when the arms of several families are borne in one and the same coat, in consequence of marriages, &c.

COM'PASS, or the **Mariner's Compass** (*compas*: *Fr.*), an instrument used by mariners to point out the course at sea. It consists of a magnetic needle, freely suspended, in connection with a circular card, the circumference of which is divided into thirty-two equal parts. This is inclosed in a box with a glass top by way of protection from the elements, allowance being made for the 'variation' of the needle: the true direction of north and south is thus ascertained. Since iron ships have come into use, it has been necessary to have recourse to various contrivances to neutralize the effect of the attraction upon the needle of the iron of the vessel.——*A pair of compasses* is an instrument used in describing circles, measuring figures, &c.; and consists of two pointed legs or branches, made of iron, steel, brass, &c., united at the top by a joint, on which they move. There are also compasses of three legs, cylindrical, spherical compasses, &c.

COMPENSA'TION PEN'DULUM (*compensatio*, the rendering of an equivalent; from *compenso*, I weigh one thing against another: *Lat.*). The efficacy which a pendulum has in regulating a clock depends upon its being of the same length at all times—if it becomes longer, its vibrations are slower, and *vice versâ*. But the effect of increased temperature is to lengthen it, and of diminished temperature to shorten it; and, as the temperature scarcely ever remains for any space of time the same, the rate of vibrations must vary, unless some means are devised to remedy this defect. The mercurial and the gridiron pendulums are the best contrivances that have been devised for the purpose. The *mercurial pendulum* consists of a rod, at the lower extremity of which is a cylindrical vessel partially filled with mercury. When the rod expands, the centre of gravity of the mercury descends—this lengthens the pendulum: but when by the very same increase of temperature the mercury expands, its centre of gravity is raised—this practically shortens the pendulum; and thus by proper management the two effects neutralize each other: the centre of gravity remains stationary, and the length of the pendulum is not altered. The *gridiron pendulum* corrects itself on the same principle: a portion of its rod consists of parallel bars of different metals, so arranged that, while one set raise the bob by expanding upwards, the others lower it by expanding downwards. The *compensation balance* used to regulate chronometers is constructed also on the same principle. While one portion tends to make it vibrate slowly, the same change of temperature causes the other portion to produce an opposite effect.

COM'PLEMENT (*compleo*, I fill up: *Lat.*), what is required to fill up some quantity. Thus, the *complement of an angle* is what it wants of 90°. Hence, in Astronomy, the complement is the distance of a star from the zenith, or what it wants of being 90 above the horizon. The complement of *a number* is what it wants of 1, 10, 100, &c.; that is, what it wants to make unity with one or more ciphers.

COMPLEMEN'TARY COL'OURS. Every prismatic colour is capable of being converted into white light by the addition to it of all the other prismatic colours. The latter colours are called complementary. Take blue, for instance; the complementary colour is that arising from a mixture of red and yellow. A mixture of yellow and blue, making green, is the complementary colour of red. M. Chevreul has prepared a chromatic table, by which the complementary colour of any of the 13,480 colours, which he has distinctly classed, can be ascertained. It is of great importance to artists, house decorators, and dealers in coloured goods, to know at once the exact colour, shade, and tint, which will produce the greatest effect when placed beside another colour.

COM'PLEX TERMS, and COM'PLEX IDEAS (*complexus*, folded together: *Lat.*), in Logic, are such as are compounded of several simple ones.

COMPLEX'ION (*complexio*, a combination, from same: *Lat.*), among Physicians, the temperament, habitude, and natural disposition of the body; but, in general use, the word means the colour of the skin.

COMPO'SING (*compono*, I place together: *Lat.*), that branch of the art of printing which consists in taking the types or letters from the cases, and arranging them in such an order as to fit them for the press. The instrument in which they are adjusted to the length of the lines is called a *composing-stick*.

COMPOS'ITÆ, (*compositus*, compounded, *Lat.*), a very large nat. order of plants, having numerous small flowers, called florets, collected into dense heads upon a disk or common receptacle, which is surrounded by an involucre or external calyx, composed of leaves or scales. The anthers are syngenesious, that is, are joined together, round the forked pistil. Frequently the florets of the middle part of the head are smaller than, and have a colour different from, those of the margin, then called the ray. The common daisy may be taken as an example. The calyx closely adheres to the fruit, and its upper part forms a ring of hairs or feathers, by means of which the ripe seed is carried away by the wind. No large trees belong to this order, which is made up of more than 8,000 species of herbaceous or shrubby plants, distributed all over the world. Many beautiful garden flowers are placed amongst the Compositæ—for example, the dahlia, aster, chrysanthemum, zinnia, sun-flower, and gazania. Some species yield bitters and tonics, such as wormwood and chamomile Tansy, arnica, elecampane, centaury, colt's-foot, and taraxacum, have more or less celebrity medicinally. The artichoke, endive, succory, lettuce, common artichoke, and Jerusalem artichoke, afford aliment to man. This order is divided into three sub-orders:—1. *Tubulifloræ*, in which the hermaphrodite florets are tubular: the asters and the daisy may be taken as examples. 2. *Labiatifloræ*, in which the hermaphrodite florets, or at least the unisexual ones, are divided into two lips; no British wild-flower falls into this sub-order. 3. *Ligulifloræ*, in which the corollas are slit or strap shaped; the dandelion, chicory, and sow-thistle are examples.

COM'POSITE NUMBERS (same *deriv.*), numbers which can be measured exactly by a number exceeding unity, as 6 by 2 or 3; so that 4 is the lowest composite number. Composite numbers between themselves, are those which have a common measure besides unity; thus 12 and 15, both of which are measured by 3.

COM'POSITE ORDER (same *deriv.*), in Architecture, the last of the five orders of columns, so called because its capital is *composed* out of those of other columns. It is also called the Roman or Italic order, from having been invented by the Romans. The angular volute of the Ionic capital was added to the proportions and enrichments of the Corinthian order. The base measures the same as in the Ionic order. The height of the column is 20 modules, that of the entablature 5 modules, and the capital has 70 minutes in height. The shaft may be either plain, or enriched with 20 or 24 flutings.

COMPOSI'TION (*compositio*, from *compono*, I place together: *Lat.*), in a general sense, the putting together and uniting of several things, so as to form of the whole one mass or compound.——COMPOSITION OF IDEAS, an act of the mind, by which it unites several simple ideas into one conception or complex idea.——In Literature, the act of inventing or combining ideas, furnishing them with words, arranging them in order, and committing them to writing.——In Logic, a method of reasoning, by which we unite together the qualities of anything, one after another, until we have distinguished it from everything else. Thus, 'man is an *animal*: he is a *hot-blooded* animal: he is a hot-blooded *viviparous* animal: he is a hot-blooded viviparous *rational* animal.' Composition, or *synthesis*, is exactly the opposite of *analysis*: one puts together, the other takes in pieces.——In Music, the art or act of forming tunes, to be performed either vocally or instrumentally.——In Painting, the putting together the several parts of a picture, so as to set off the whole to the best advantage.——In Commerce, an agreement entered into between an insolvent debtor and his creditor, by which the latter accepts a part of the debt in compensation for the whole.——In Chemistry, the combination of different substances, from which results a compound substance, differing in properties from any of its component parts. Thus water is a compound of hydrogen and oxygen, which are invisible gases.——COMPOSITION OF FORCES: when two forces simultaneously act upon the same body, so as to set it in motion, it will obey neither of the forces taken separately, but will move along the diagonal of a parallelogram, the two adjacent sides of which will be represented by the two forces. And thus, centripetal force, which tends to draw the earth towards the sun, combined with the force of projection, which is at right angles to it, causes the earth to revolve in its orbit.

COM'POST (*compositus*, compounded; from *compono*, I place together: *Lat.*), in Husbandry, several sorts of soils or earths, and other matters, mixed together, in order to make a compound suitable for fertilizing land.

COM'POUND (*compono*, I place together: *Lat.*), a term in Botany, variously applied. Thus, a compound *flower* consists of several distinct florets, upon a common receptacle, surrounded by a common involucre; a compound *stem* is one that divides into branches: a compound *leaf* consists of several leaflets on a common petiole: a compound *umbel* is one which has all its rays or peduncles bearing small umbels at the top.——COMPOUND INTEREST, in Computation, is interest upon interest; when the interest of a sum is added to the principal, and then itself bears interest.——COMPOUND QUANTITIES, in Algebra, are such as are joined by the signs + and − (*plus* and *minus*), and expressed by more letters than one, or by the same letters unequally repeated: thus, $a+b-c$, and $ab-b$, are compound quantities.——COMPOUND, a word employed by Anglo-Indians to signify the enclosure within which their houses, offices, and outbuildings stand. Some derive the word from the Portuguese *campainha*, but it may originate from the Malay *campong*, a village.

COMPRES'SIBIL'ITY (*compressibilis*, from *comprimo*, I squeeze together: *Lat.*), in Physics, that property in a solid or fluid of yielding to the pressure of another body or force, so as to be brought into a smaller compass. All bodies may be compressed, since all have pores; but liquids resist compression with enormous force.

CON, in Language, a Latin inseparable preposition or prefix, joined to other words. *Con* and *cum* have the same signification, except that *cum* is used separately, and *con* in composition.——In the phrase *pro* and *con* (*pro* and *contra*), for and against, *con* denotes the negative side of a question.

CONCATENA'TION (*concatenatio*, from *concateno*, I link together: *Lat.*), a term chiefly used in speaking of the mutual dependence of second causes upon each other.

CON'CAVE GLASSES (*concavus*, hollow: *Lat.*), in Optics, such as are ground hollow: they are usually spherical, though they may be of any other figure. A concave lens renders rays of light divergent, or less convergent. Hence it is used with *short sight*, which arises from the rays being brought to a focus, by the crystalline lens of the eye, too soon—that is, before they reach the retina.

CONCA'VO-CON'CAVE (same *deriv.*), hollow or concave on both surfaces.

CONCA'VO-CON'VEX (*concavus*, hollow; and *convexus*, arched: *Lat.*), concave on one side, and convex on the other.

CONCEN'TRATE (*con*, together with; and *centrum*, a centre: *Lat.*), to bring nearer to each other; as, to concentrate particles of salt by evaporating the water that holds them in solution; or to concentrate rays of light into a focus.

CONCEP'TACLE (*conceptaculum*, a receptacle: *Lat.*), in Botany, the cases containing the reproductive organs of plants, which, like ferns, have them at the back of the leaves. Also, a pericarp of one valve, opening longitudinally on one side, and having the seeds loose in it.

CONCEP'TION (same *deriv.*), in Logic, the simple apprehension or perception which we have of anything, without proceeding to affirm or deny anything about it. An act of the mind, by which we combine individuals together, through some character common to them all. Thus, all kinds of triangles resemble each other, in having three sides.

CONCER'TO (harmony: *Ital.*), in Music, a piece composed specifically for a particular instrument, which is, however, at times accompanied by others.——CONCERTO-GROSSI, the grand chorus of a concert, or those places where all the several parts perform or play together.

CON'CHA (*konchē*, a shell: *Gr.*), in Anatomy, the larger cavity of the external ear, situated before the *meatus auditorius*, or passage into the internal ear.

CONCHIF'ERA (*konchē*, a shell; and *phero*, I bear: *Gr.*), a class of molluscs, living in bivalve shells. They are divided into two sections, those with and those without siphonal tubes for respiration. The cockle is an example of the first, the oyster and scallop of the second section.

CON'CHOID (*konchē*, a shell; and *eidos*, form: *Gr.*), in Geometry, the name of a curve invented by Nichomedes, for the solution of two celebrated geometrical problems, 'the duplication of the cube,' and 'the trisection of an angle.' Sir Isaac Newton observes that he prefers it before other curves, or even the conic sections, in the construction of cubic and biquadratic equations, on account of its simplicity.

CONCHOID'AL (same *deriv.*), in Mineralogy, a term applied to the fracture when there is a convex elevation and a concave depression, like the valve of a shell-fish.

CONCHOL'OGY (*konchē*, a shell; and *logos*, a discourse: *Gr.*), is to be considered as a branch of the science of Malacology, or the study of the Mollusca, one of the great subdivisions of the animal kingdom. Conchology has reference only to the structure and shape of the shells with which the bodies of many mollusca, but not all, are protected. The study of the animals belongs to the malacologist. Carbonate of lime is the basis of shell, with a small quantity of animal matter. It is secreted by the mantle of the animal, and added layer by layer to that which has been already formed. Shells vary in texture, some being porcellanous, others nacreous or pearly, whilst fibrous, horny, and glassy structures may be seen in others. In some shells there are two layers, the outer one composed of solid prismatic cells, sometimes resembling minute crystals placed side by side, and the inner one a nacreous layer, which, in certain large shells, yields the mother of pearl of commerce. The lustre which is peculiar to mother of pearl has been found to arise from the undulations of an extremely thin membrane, which alternates with layers of carbonate of lime. In a few cases the shell is internal; in the great majority it is external. Of the shell-bearing mollusca, three-fourths have only one shell, that is, are univalve. Another large section have two shells, and are therefore termed bivalves. A few have more pieces, and the chitons, which are very unlike other shell-bearing mollusca, have as many as eight. Shells are usually covered with a skin, epidermis, or periostracum, sometimes very thin, at others thick; whilst occasionally it is covered with hair. As to the **UNIVALVES**, the shells are usually spiral, but sometimes conical, like the limpet's, or tubular. The cavity is always a single chamber, except amongst the nautili, when it is *camerated*, that is, divided into several chambers, and the mouth is frequently closed when the animal has withdrawn into its shell, by a horny or calcareous plate, called the *operculum*. The upper part of the shell is the *spire*, and the point of this the *apex*. The whorls twist round a central axis, or *columella*, which is sometimes open or hollow, when the shell is said to be perforated, the hollow itself being termed the *umbilicus*. The mouth of the shell is termed the *aperture*, and this is often produced into a canal below, whilst the margin, with its outer and inner, or columellar lips, is styled the *peristome*. In some shells, the apex is broken off, and then the shell is styled *decollated*. BIVALVES are either *equivalve*, when the two valves are of the same size and shape, or *inequivalve*, the latter being the case when one of the valves adheres to a foreign substance. Most bivalves are *inequilateral*, that is, one side is shorter than the other side. The *beak*, or umbo, near the hinge, is the apex or point from which the valve begins to grow. The *umbones* are either straight, curved, or spiral; and sometimes one valve is spiral and the other flat. The surface of the valves is often marked with ridges which radiate from the beaks to the margin; or with concentric ridges, which represent the stages of growth. In front of the beaks there is an oval space, called the *lunule*. The valves are fastened together by an elastic ligament, which causes them to open when the *adductor* muscles inside the shell relax. The hinge is furnished with teeth, which differ in shape and number, and afford characters for distinguishing genera. The teeth on one side fit into pits on the other. The teeth placed immediately under the umbo are called hinge or cardinal teeth: those to the side are termed lateral. Looking at the interior of the valves, there is usually to be seen either a single rounded depression (when the shell is termed *monomyary*), or two such depressions, when it is termed *dimyary*. These are the sites of the attachments of the adductor muscles. There is also to be seen a line, which more or less follows the direction of the margin of the shell. This is the *pallial* line, and is produced by the margin of the mantle. When the animal possesses retractile siphons, this pallial line usually makes a bend inwards, which bend is termed the *pallial sinus*. In describing a shell, it must be understood that the anterior or front side is that to which the beaks turn, whilst the ligament is on the posterior side. When the shell is placed with the hinge downwards, the beaks being turned towards the observer, and the ligament therefore away from him, the valve on his left hand is the left valve, and the other the right valve.

CONCHOM'ETER (*konchē*, a shell; and *metron*, a measure: *Gr.*), an instrument for measuring shells.

CON'CLAVE (*conclavium*, literally shut up with one key: from *con*, together with; and *clavis*, a key: *Lat.*), the *place* in which the cardinals of the Romish church meet for the election of a pope: also the *assembly* of cardinals. The latter are locked up in separate apartments, and meet once a day in the chapel of the pontifical palace in which they are assembled, where their votes, given on a slip of paper, are examined. This continues until two-thirds of the votes are in favour of one person. [See ADORATION.] The ambassadors of France, Austria, and Spain, have a right, on the part of their respective courts, to put in a veto against the election of one cardinal.

CONCOC'TION (*concoctio*, from *concoquo*, I digest: *Lat.*), in Medicine, the process by which food is turned into *chyle*, or otherwise prepared to nourish the body.

CON'CORD (*concordia*, from *concors*, harmonious: *Lat.*), in Music, the union of two or more sounds pleasing to the ear. The words concord and harmony are, in fact, the same thing, though custom has applied them somewhat differently.——In Grammar, that part of syntax which treats of the agreement of words in a sentence.——In Law, an agreement between the parties in a fine, made by leave of the court.

CONCOR'DANCE (*concordo*, I harmonize with: *Lat.*), a dictionary of the Bible, in which the leading words used in scripture are arranged alphabetically, and reference is made to the various places in which they occur; that the student may determine the meaning of any passage, by collating it with another. The first Concordance was compiled in 1262. The best English Concordance is that of *Cruden*, published in 1737.

CONCOR'DAT (*concordo*, I agree with: *Lat.*), a treaty or public act of agreement between the pope and any prince, relative to ecclesiastical matters.

CON'CRETE (*concretus*, grown together: *Lat.*). In Logic, a *concrete term* expresses the notion derived from the view taken of any object, with reference to, or as in conjunction with, that which furnished the notion:—thus, *foolish*, or *fool*. When the notion is expressed without any such reference, it is an *abstract term*:—thus, *folly*.——A builder's term for a mixture of mortar and gravel, frequently employed on laying the foundation of a building.

CONCRE'TIONS (*concretio*, from *concresco*, I grow along with: *Lat.*), MORBID, in animal economy, hard substances that occasionally make their appearance in different parts of the body, as well in the solids as in those cavities destined to contain fluids: in the former, they are denominated *ossifications*; in the latter, *calculi*.

CONCUS'SION OF THE BRAIN (*concutio*, I shake: *Lat.*), in Surgery, an injury sustained by the brain, in consequence of sudden and violent pressure upon it. The effect is generally termed a *stunning*. It must be watched with great care; since the patient may seem to recover from the insensibility, &c., while dangerous inflammation is going on.

CONDENSA'TION (*condensatio*, from *condenso*, I press close together: *Lat.*), the act by which a body is rendered more dense, compact, and heavy. Hence condensation stands opposed to *rarefaction*. The term is generally applied to the conversion of vapour into a fluid.

CONDEN'SER (*condenso*, I press close together: *Lat.*), a pneumatic machine by which a volume of air may be reduced into a much smaller space. It is like an air pump, except that the valves are reversed, opening *inwards* instead of *outwards*; and is used to force a large quantity of air into a given space.—Also, that part of a steam engine to which the steam passes from the cylinder, and where it is reduced to the liquid state by cold water.

CONDI'TION (*conditio*: *Lat.*), in Law, a restraint annexed to a thing, so that by non-performance, the party shall receive loss, and by the performance, advantage. It is most generally used to signify a term, on which a grant is made. Conditions are *precedent* when anything is obtained by performance of them: *subsequent*, when they are not to be performed until after acquisition. If the breach of a condition can be compensated for, the party breaking it will generally be relieved from the consequences in equity.——CONDITIONAL PROPOSITION, in Logic, that which asserts the dependence of one categorical proposition on another. Thus, 'if the child falls, it will be hurt.' The proposition from which the other results is the *antecedent*: the result is the *consequent*.——CONDITIONAL SYLLOGISM, a syllogism, in which the reasoning depends on a conditional proposition. It is of two kinds, constructive and destructive. 'If A is equal to B, C is equal to D, but A is equal to B, therefore C is equal to D,' is *constructive*. 'If A is equal to B, C is equal to D, but A is not equal to B, therefore C is not equal to D,' is *destructive*.

CON'DOR, a very large kind of vulture, (the *Sarcoramphus gryphus* of ornithologists), the size of which, however, was greatly exaggerated by the earlier writers. It is about four feet in length, and the expanded wings measure about nine feet. The condor selects its breeding place at a height of more than 10,000 feet on the Andes. It feeds chiefly on dead carcases; but two will occasionally unite in overpowering and bearing away even large animals.

CONDOTTIE'RI (*Ital.*). These were men who, in the middle ages, raised corps of soldiers at their own expense, and then entered the service of some prince or government. Such soldiers of fortune were turbulent and rapacious, and frequently robbed their employers. An Englishman, Sir John Hawkwood, who died at Florence in 1393, was one of the last.

CONDUC'TOR (*Lat.*, from *conduco*, I lead), in Electrical experiments, a body capable of transmitting the electric fluid. It is called also a *non-electric*; for, unless insulated, it will not exhibit electrical excitement, the electricity being carried off along it as fast as it is communicated to or excited upon it. The metals are the best conductors: resinous substances are very bad ones. Bodies incapable of transmitting electricity are called *non-conductors*; and, because electricity may be communicated to or excited upon them, without artificial insulation, they are termed *electrics*. There is no body a perfect conductor, or a perfect non-conductor. The non-conducting power depends very much on the extent of non-conducting surface.——LIGHTNING CONDUCTOR, a pointed metallic rod fixed to the upper parts of buildings to secure them from the effects of lightning. It is connected with the earth, or, what is better, the nearest water, by a good conductor, which is sufficiently thick not to be melted in transmitting the electricity; and which where attached to the wall, is insulated by non-conductors, so that the electricity may not be diverted to the building, instead of passing harmlessly away.

CON'DUIT (*Fr.*), a subterraneous or concealed aqueduct. The ancient Romans excelled in them, and formed the lower parts, through which the water ran, with a cement of such an excellent quality, that it has become as hard as the stone itself which it was employed to join.——CONDUITS, in modern times, are generally pipes of wood, iron, or pottery, for conveying the water from the main spring, or reservoirs, to the different places where it is required.

CONDU'PLICATE (*conduplico*, I double together: *Lat.*), in Botany, a leaf is said to be conduplicate when it is folded laterally in the bud, like an oak leaf. The term is also applied to the embryo in a section of cruciferous plants, where the cotyledons are bent and the radicle is enclosed between their folds.

CON'DYLE (*kondulos*, a knuckle: *Gr.*), in Surgery, a rounded protuberance on the end of a bone; a knuckle.

CON'DYLOID (*kondulos*, a knuckle; and *eidos*, form: *Gr.*), in Anatomy, the CONDYLOID PROCESS, or Condyle, is the posterior of the two protuberances which are placed at the upper side of the back of the under jaw. By this the jaw is articulated to the glenoid cavity of the temporal bone. The anterior of the protuberances is called the coronoid process.

CONE (*konos*: *Gr.*), in Geometry, a solid figure having a circle for its base, and its top terminating in a point or vertex, like a sugar-loaf. A *right* cone has its axis perpendicular to its base, and its sides equal. It is supposed to be formed by the revolution of a right-angled plane triangle about one of its perpendicular sides. Any other cone is *oblique*. To find the curve surface of a cone, multiply half the product of the circumference of the base by the slant side. If the area of the base be added to this, the sum is the whole surface. The solidity of a cone is ascertained by multiplying one-third of the product of its base by its altitude. The *frustum of a cone* is that part which remains after cutting off the upper portion by a plane parallel to the base. To ascertain the solidity of such a frustum add the squares of the diameters of the two ends to the product of the two diameters, and multiply the sum by the height and by ·2618.——CONE, in Botany, the fruit of several trees forming the order of *Coniferæ*. It is composed of woody scales, variously shaped, each having a seed at the base.——In Conchology, a univalve shell, some specimens of which bring very large prices, on account of their beauty and rarity.——CONE OF RAYS, in Optics, the aggregate of the rays which proceed from a luminous point, or from a single point of a luminous object.

CONFEC'TION (*confectio*, a composing: *Lat.*), a sweetmeat or anything prepared with sugar. It also signifies a liquid or soft electuary, of which there are various sorts

CONFED'ERACY (*confœderatio*, an agreement: *Lat.*), in Law, a combination of two or more persons to do some damage or injury to another, or to commit some unlawful act.——In Politics, the alliance of independent states, for some common object.

CONFERVA'CEÆ, a large division of Algæ, principally microscopical plants, which abound wherever there is water or damp air. They are composed of articulated threads, and are usually of a green colour. What has been called 'meteoric paper' consists of a matted sheet of some species formed on the surface of a pool which afterwards dries up. Closely allied plants sometimes occur in the sea, in such abundance that they discolour it. These are of a red colour, and sailors have given the name of sea-sawdust to them. The Red sea is supposed to acquire its name from the tinge communicated to it by such plants. The word *Conferva* comes from *confervere*, to boil, from the bubbles given off by the plants.

CONFES'SION (*confessio*, from *confiteor*, I acknowledge: *Lat.*), in a Legal sense, the acknowledgment of something prejudicial to the person making the declaration.——In Theology, a public declaration of one's faith, or the faith of a public body. Also a part of the Liturgy, in which an acknowledgment of guilt is made by the whole congregation. Among the Jews, it was a custom, on the annual feast of expiation, for the high-priest to make confession of sins to God in the name of the whole people.——AURICULAR CONFESSION, a private confession or acknowledgment of sins, made by each individual in the Romish and Greek churches to the priest. [See AURICULAR CONFESSION.]

CONFESSION OF FAITH, a formulary, detailing the opinions held by a religious community. The Apostles', Athanasian, and Nicene creeds, are the most ancient of such formularies. In addition to these, Roman Catholics refer to the decrees and catechism of the Council of Trent, and the creed of Pius IV., as of primary authority, to the rule of faith of Verronius, and the exposition of Bossuet, &c., as of secondary. The symbol of Mogila is the most authentic exposition of the doctrines of the Greek Church. The 39 Articles, the 3 articles of the 36th canon, the Book of Common Prayer, and the Homilies, are authorized statements of the doctrines of the Church of England. The confession of Augsburg, the articles of Smalcald, Luther's great and little catechisms, and the 'form of concord,' detail the doctrines of the Lutheran church. The confession of the Westminster assembly is the formula of the Scottish church, last drawn up.

CONFES'SOR (*Lat.*, from *confiteor*, I acknowledge), in Church History, one who has proclaimed his faith in difficult and trying circumstances, without his zeal having been tested to the extent of martyrdom.——In the Roman Catholic church, a priest, who hears confessions, and is empowered to grant absolution to those who confess.

The person whose confession he hears is called his penitent; and the seat, or cell, in which he sits to hear confessions is called the *confessional*.

CONFIGURA′TION (*configuratio*, from *configuro*, I fashion after: *Lat.*), in Astrology, the aspects of the planets at a certain time. The astrologers pretended that the stars, in a given configuration, aided or opposed each other in their influence on the destinies of individuals.

CONFIRMA′TION (*confirmatio*, from *confirmo*, I strengthen: *Lat.*), the act or ceremony in the Christian church of the laying on of hands, by which baptized persons are confirmed in their baptismal vows. The ceremony is performed by the bishop; and the antiquity of it is, by all ancient writers, carried as high as the apostles, upon whose example and practice it is founded. In the Romish church it is considered a sacrament. ——CONFIRMATION, in Law, an assurance of title, by the conveyance of an estate or right *in esse*, from one person to another, by which a possession is made perfect, &c. ——CONFIRMATION, in Rhetoric, the third part of an oration, in which the orator undertakes to prove the truth of the proposition advanced in his narration.

CONFISCA′TION (*confiscatio*, from *confisco*, I seize for the public treasury: *Lat.*), in Law, the condemnation and adjudication of goods or effects to the public treasury.

CON′FLUENT (*confluens*, flowing into: *Lat.*), in Botany, a term for parts that have grown together, so that the line of junction is not visible.——In Anatomy, two bones are said to be confluent, when, having been originally separate, they have become blended together.——In Medical Science, running together, and spreading over a large surface of the body, as the *confluent* small-pox.

CONFORM′ABLE, in Geology, a term applied to a stratum that lies upon another parallel wise. If a stratum lies upon the edges of the strata below, it is said to be unconformable. Unconformity shows that the lower strata had been disturbed, and probably denuded, before the upper stratum had been deposited.

CONFORMA′TION (*conformatio*, from *conformo*, I put together: *Lat.*), the particular texture or structure of a body, or disposition of the parts which compose it. ——MAL-CONFORMATION, or *Malformation*, in Anatomy, denotes some defect in the first rudiments, by which a person is born either crooked, or with some part of the body unduly proportioned, &c.

CONFOR′MIST (*conformis*, similar: *Lat.*), in Ecclesiastical concerns, one that conforms to the Established Church; the seceders or dissenters from which are called *Non-conformists*.

CONFU′CIUS, DOCTRINES OF. These relate to morals and politics, and are the foundation of the ethics and system of government of the Chinese, who have built innumerable temples to him, where they do him service. The philosopher's real name was Koong-foo-tse, which has been Latinised into its present form by Europeans. The date of his birth is uncertain, some placing it four and a half centuries, others three and a half centuries before our era. His writings, which form nine works, have become the sacred books of the Chinese. They inculcate the duty of entire submission of children to parents. As a ruler stands in the relation of a father to his subjects, the doctrine of submission has been extended from families to the nation, and hence the memory of Confucius has always been revered by the emperors. He laid down the excellent rule that we ought to treat others as we would have them to treat us. That he leaned towards predestination, and the prediction of events, is not wonderful. He thought that the human body is composed of two principles, one of which, at the period of their separation, descends into the earth, the other is invisible, and ascends into the air. The spiritual part of the good man is permitted to visit its former abode on earth, or rather the hall or temple which it is the custom of the Chinese to erect, and wherein they perform sacred rites to the memory of their ancestors. He seems not to have conceived of a Deity with a personal being or form. He maintained that out of nothing there cannot possibly be produced anything; that material bodies must have existed from all eternity; that the cause or principle of things must have had a co-existence with the things themselves; that therefore this cause is also eternal, infinite, indestructible, without limits, omnipotent and omnipresent. Since the time of Confucius, the Buddhist religion has entered China, and brought with it idols and images, objects always needed to fix the attention and excite the devotion of the mass of the people.

CON′GE (*conger*, to take leave of: *Fr.*), in Architecture, the small curvature at each end of the shaft, termed also the *apophyge* (*apofugo*, I fly away: *Gr.*). When the congé is in the form of a *quarter round*, or *echinus*, it is called a *swelling congé;* but when in the form of a *cavetto*, a *hollow congé*.

CONGE′ D'ELIRE (*Fr.*), in Ecclesiastical affairs, the king's permission to a dean and chapter, in the time of a vacancy, to choose a bishop. It is a mere matter of form, for the person named in the writ must be chosen.

CONGELA′TION (*congelatio*, a freezing: *Lat.*), such a change produced by cold in a fluid body, that it quits its liquid state and becomes a solid.

CON′GER (*Lat.*), a voracious marine eel, the *Conger vulgaris* of naturalists. It has been taken on the Cornish coast, more than ten feet long, and weighing 130 lbs.

CONGE′RIES (*Lat.*), a collection of several particles or bodies united into one mass or aggregate.

CONGES′TION (*congero*, I accumulate: *Lat.*), in Medicine, an unnatural accumulation of blood in the capillary vessels, or any part of the sanguiniferous system. Congestion of the brain, liver, or lungs, is often the effect of fevers, though usually consequent on a previous morbid state of these organs.

CONGLOM′ERATE (*conglomero*, I heap together: *Lat.*), in Botany, an epithet for flowers growing on a branching peduncle or foot-stalk, upon short pedicles closely compacted together.——In Mineralogy, a sort of pudding-stone composed of pebbles of quartz, flint, silicious slate, &c., cemented together.——CONGLOMERATE GLAND, in Anatomy, a gland composed of many smaller glands, whose excretory ducts unite in a common one, as the salivary glands.

CONGREGA'TIONALISTS (*congregatio*, an association: *Lat.*), in Church History, a sect of Protestants who reject all church government, except that of a single congregation, which, they maintain, has the right to choose its own pastor and govern itself. They have been called *Brownists*, from their founder: and, latterly, *Independents*. They believe in the Trinity, predestination, total depravity, particular redemption, effectual grace, and final perseverance.

CON'GRESS (*congressio*, from *congredio*, I meet: *Lat.*), an assembly of envoys, commissioners, deputies, &c., from different courts, who meet to concert measures for their common good, or to adjust their mutual concerns. Having exchanged their credentials, the envoys of the different powers carry on their negotiations directly with each other, or by the intervention of a mediator, either in a common hall, or at their own residences, by turns, or, if there is a mediator, in his residence. These negotiations are continued, either by writing or by verbal communication, until the commissioners can agree upon a treaty, or until one of the powers dissolves the congress by recalling its minister.——CONGRESS OF THE UNITED STATES OF AMERICA. The assembly of senators and representatives of the several states of North America, forming the legislature of the United States, is designated, in the constitution of the general government by this title. It consists of a senate and a house of representatives, each constituting a distinct and independent branch.— The *house of representatives* is chosen every two years, by the people of the several states; and the voters and electors are required to have the same qualifications as are requisite for choosing the members of the most numerous branch of the legislature of the state in which they vote. Each state, however small its population, is entitled to at least one representative; but upon the whole population there cannot be more than one for every 30,000 persons, and the number of representatives apportioned to each state is altered every ten years. No person can be a representative who has not attained the age of twenty-five years, and been seven years a citizen of the United States, and who is not, when elected, an inhabitant of that state in which he has been chosen. No other qualifications are required.—The *senate* is composed of two senators from each state, who are chosen by the legislature of the state for six years; and are divided into three classes, so that one-third of them is, or may be, changed by a new election every second year. No person can be a senator who is not thirty years of age, and has not been nine years a citizen of the United States, and is not, when elected, an inhabitant of the state for which he is chosen. The times, places, and manner of holding elections for senators and representatives are appointed by the state legislatures. Each house determines the rules of its own proceedings, and has power to punish its members for disorderly conduct. Neither house, during the session of congress, can, without the consent of the other, adjourn more than three days, nor to any other place than that in which the two houses shall be sitting. The senators and representatives are entitled to receive a compensation, provided by law, for their services, from the treasury. They are also privileged from arrests, except in cases of treason, felony, or breaches of the peace, during their attendance at the session of their respective houses, and in going to and returning from it.

CON'GREVE ROCK'ET, so named from its inventor, Sir W. Congreve, a formidable weapon of destruction, consisting of a tubular case of copper or iron, filled with combustibles, which is impelled against the hostile ranks of an army, or the walls of a fortress. Congreve rockets were first used in the attack on Boulogne in 1806. *Carcass rockets*, as those for bombardment are called, are armed with strong iron conical heads, pierced with holes, and containing a substance as hard and solid as iron itself, which, when once inflamed, is inextinguishable, and scatters its burning particles in every direction. When this substance is consumed, the ball explodes like a grenade. The rocket is projected horizontally, and whizzes loudly as it flies through the air Congreve rockets were at first considered a most important invention, but experience has shown that in the field they are much less efficient than the common artillery, and in sieges do less injury than red-hot shot and bombs.

CON'IC SEC'TIONS, in Geometry, such curved lines as are produced by the intersection of a plane and a cone. The different positions of an intersecting plane give rise to five different figures or sections, viz. the *triangle*, formed by a plane passing through the vertex; the *parabola*, by a plane passing through one side, and parallel to a plane touching the other; the *hyperbola*, by a plane passing through one side, but not parallel with a plane touching the opposite side; the *circle*, by a plane passing through both sides and cutting off a right cone containing the vertex; and the *ellipse*, by a plane passing through both sides obliquely. The parabola, hyperbola, and ellipse, are the only curves which are peculiarly conic sections.

CONIF'ERÆ (*conus*, a cone; and *fero*, I bear: *Lat.*), in Botany, a natural order of trees and shrubs which are found in almost every part of the globe. They are most important to mankind for their resins, among which are turpentine, pitch, Canada balsam, &c.; and for their timber, under the names of fir, pine, deal, cedar, &c. The fruit usually forms what is termed a cone, a more or less ovoid mass of scales, at the base of each of which are one or two seeds. The ovule has no covering, but receives the fertilising pollen through the foramen, without the intervention of a stigma. Hence they have been placed in a class called Gymnogens (*gumnos*, naked: *Gr.*). In the genera of Pinus, Abies, Larix, and Cedrus, the leaves are long and slender, whence the Germans term the species needle-trees. But in other genera the leaves are broad. Some of the loftiest trees in the world belong to this order; the Wellingtonia of California, and the Douglas and Lambert Pines of North America, are more than 300 feet high. The beautiful Norfolk Island Pine, the **Huon** Pine of Tasmania, and the **Cowrie** Pine of New Zealand, are also lofty trees. On the other hand, there are some Dacrydia in New Zealand no larger than mosses. To this order belong the various species of **Cedar**, **Juniper**, **Cypress**, **Larch**, **Pine**, and **Fir**. The great bulk of the vegetable remains found fossilised in the state of coal consists apparently of extinct coniferous trees.

CONI'UM (*kōneion*, from *kōnao*, I whirl about: *Gr.*, on account of its intoxicating effects), in Botany, a genus of plants, nat. ord. *Umbelliferæ*, including the common Hemlock, *C. maculatum*, a poisonous plant, from which an alkaloid, *conia*, or *conine*, used in medicine, is obtained.

CON'JUGAL RIGHTS (*conjugalis*, belonging to marriage: *Lat.*). The restitution of conjugal rights is a species of matrimonial suit, which may be brought either by the wife or husband against the party who is living in a state of separation.

CON'JUGATE (*conjugo*, I join together: *Lat.*). **Conjugate Axis**, in Geometry, that which crosses another axis.——**Conjugate Diameter**, the shortest axis of an ellipsis.——**Conjugate Hyperbolas**, hyperbolas having the same axis, but in contrary order.

CONJUGA'TION (*conjugatio*, a combining: *Lat.*), in Anatomy, is applied to a pair of nerves, arising together, and serving the same operation, sensation, or motion.——**Conjugation**, in Grammar, the distribution of the several inflections or variations of a verb, in their different voices, moods, tenses, numbers, and persons.

CONJUNC'TION (*conjunctio*, from *conjungo*, I join together: *Lat.*), in Astronomy, the meeting of two or more stars or planets in the same point of the heavens. It is either true or apparent. *True conjunction* is when a right line, drawn from the centre of the earth through the centre of one of the bodies, would pass through that of the other. *Apparent conjunction* is when a line from the centre of the earth would not pass through the centres of both bodies. The moon is in conjunction with the sun when they meet in the same point of the ecliptic, which happens every month; and eclipses of the sun are always occasioned by the conjunction of the sun and moon, in or near the nodes of the ecliptic.—— **Conjunction**, in Grammar, an indeclinable word, or particle, which serves to join words and sentences together.

CON'NATE (*connatus*, born at the same time: *Lat.*), in Botany, an epithet for leaves, which are united at their bases, as in the garden honeysuckle.——In Anatomy, the term *connate* signifies that the ossification of the common fibrous or cartilaginous bases of two bones proceeds from one point or centre, and so converts such bases into one bone.

CONNI'VENT (*conniveo*, I wink: *Lat.*), in Botany, a term applied to the divisions of a calyx when they arch inwards.——**Connivent Valves**, in Anatomy, a term applied to the valvular folds of the lining membrane of canals, which are so disposed as to retard, while at the same time they permit (*connive at*), the passage of the contents of such canals.

CONNOISSEU'R (*Fr.*, from *connattre*, to know), a critical judge or master of any art, particularly of painting, sculpture, and the belles lettres.

CO'NOID (*konos*, a cone; and *eidos*, form; *Gr.*), in Geometry, a solid formed by the revolution of a conic section about its axis. — In Anatomy, a gland found in the third ventricle of the brain, called the pineal gland from its resemblance to a cone or pine-apple.

CON'QUEST (*conquête*: *Fr.*), the right over property or territory acquired in war. It presupposes a just war, and is generally admitted as a part of the law of nations. Conquest may respect either persons or things: it may apply to a whole nation, or to a single town or province; and it may be temporary or permanent. Where persons are not found in arms, but are included as inhabitants of a town or province which has surrendered, they are treated generally as subjects. The original allegiance to their own government is suspended, and they come under an implied obligation to the conqueror, to submit to his orders, and to demean themselves, for the time, as faithful subjects. Under such circumstances, the conqueror generally leaves them in possession of their property, and punishes them only for rebellious or traitorous conduct. It is not usual, in modern times, to change the fundamental laws of a conquered country; but the sovereign power of the conqueror so to do is conceded by the law of nations.

CONSANGUIN'ITY (*consanguinitas*: from *consanguineus*, related by blood: *Lat.*), the relation which subsists between persons who are sprung from the same stock or common ancestor, in distinction from affinity, or relation by marriage. It terminates in the sixth or seventh degree, except in the succession to the crown, in which case it is continued to infinity.

CON'SCRIPT (*Lat.*, from *conscribo*, I write together), in Roman Antiquity, an appellation given to the senators of Rome. The number of senators was increased to 300 when the *Luceres* were incorporated with the Roman people, as a *third* tribe. Sulla increased their number to 500 or 600; Julius Cæsar to 900; and it afterwards became 1000, but was subsequently reduced to 600. ——**Conscript**, in the French armies, an enrolled soldier or recruit.

CONSCRIP'TION (*conscriptio*, from same), the enlisting those inhabitants of a country who are capable of bearing arms, by a compulsory levy, at the pleasure of the government. The term is derived from the military constitution of ancient Rome. Under the consulship, all persons capable of bearing arms were obliged, under penalty of losing their fortune and liberty, to assemble in the Campus Martius, or near the capitol, where the consuls, seated in their curule chairs, made the levy, by the assistance of the legionary tribunes. The consuls ordered such as they pleased to be called out of each tribe, and every one was obliged to answer to his name, after which as many were chosen as were wanted.——France, in the beginning of the revolution, declared it the duty and honour of all citizens to serve in the army of their country. Every French citizen was born a soldier, and obliged to serve in the army from sixteen to forty years of age; from forty to sixty he belonged to the national guard. Every year the young men of the military age were assembled, and distributed in the different military divisions: and it was decided by lot who, among the able-bodied men of suitable age, should take arms. Thus it was that those prodigious masses were so quickly raised, and sent to the field of slaughter.

CONSECRA'TION (*consecratio*, from *consecro*, I dedicate: *Lat.*), the act of devoting and dedicating anything to the service and worship of God.——CONSECRATION was also a religious rite among the Romans, by which they set any person or thing apart for sacred purposes, as their high-priests; or made it sacred, or a fit object of divine worship, as the emperors, their wives, or children, who were in this manner enrolled among their gods. This was sometimes called *apotheosis*, but on medals it is distinguished by the word *consecratio*, with an altar, or some other sacred symbol.

CONSEC'TARY (*consectarius*, that which follows logically: *Lat.*), in Geometry, some consequent truth obtained from a demonstration.

CON'SEQUENCE (*consequentia*, from *consequens*, coming in order: *Lat.*), that which follows as an inference of truth and reason, from admitted premises or arguments.

CONSERVA'TOR (a defender, from *conservo*, I preserve: *Lat.*), an officer appointed for the security and preservation of the privileges of some cities, corporations, and communities, or for the protection of some places. The ancient office of *conservator of the peace* is now performed by all judges and magistrates, but particularly by *justices of the peace*.

CONSER'VATORY (same *deriv.*), a term sometimes used for a greenhouse. It is, properly, a large glazed building for exotics, in which the plants are planted in beds and borders, and not in tubs or pots, as in the common greenhouse.——In various parts of Italy and France there are musical schools called *conservatories*, which are expressly intended for the scientific cultivation of musical talent, and through which many first-rate composers, as well as vocalists, have attained their proficiency.

CON'SERVE (*conservo*, I preserve: *Lat.*), in Pharmacy, a form of medicine contrived to save the flowers, herbs, roots, fruits, or simples, as nearly as possible in their natural fresh state.

CONSIDERA'TION (*consideratio: Lat.*), in Law, the material cause or ground of a contract, without which the party contracting would not be bound. A consideration is either express or implied: *express*, when the thing to be given or done is specified; *implied*, when no specific consideration is agreed upon, but justice requires it, and the law implies it: as when a man labours for another, without stipulating for wages, the law infers that he shall receive a reasonable *consideration*. Also, a consideration is either *valuable*, that is, for money, or an equivalent, or of *natural affection*, certain degrees of relationship being a consideration for a gift.

CONSI'GNMENT OF GOODS (*consignatio*, a document: *Lat.*), in Commerce, the delivering or making them over to another: thus, goods are said to be consigned to a factor when they are sent to him for sale, &c. He who consigns the goods is called the *consignor*, and the person to whom they are sent is called the *consignee*.

CONSISTO'RIUM (*Lat.*, from *consisto*, I abide), in Antiquity, a council-house, or place of audience.

CONSIS'TORY COURT, the place in which a court is held by the bishop or his chancellor.

CON'SOLE (*Fr.*), in Architecture, a species of bracket; or an ornament cut upon the key of an arch, which has a projection. Sometimes it serves to support cornices, figures, busts, and vases. Consoles are also called *Ancones*.

CONSOLIDA'TION (*consolidatio*, from *consolido*, I make firm: *Lat.*), in the Civil Law, the uniting the possession or profit of land with the property, and *vice versâ*. In the Ecclesiastical Law, it is the uniting two benefices into one by assent of the ordinary, patron, and incumbent.——CONSOLIDATION, in Surgery, the action of uniting broken bones, or the lips of a wound, by means of applications.

CON'SOLS, funds formed by the *consolidation* (of which word it is an abbreviation) of different annuities, portions of the public debt of Great Britain, which had been severally formed. [See FUNDS.]

CON'SONANT (*consonans*, from *consono*, I sound at the same time: *Lat.*), a letter so named because it requires to be sounded in connection with a vowel. Some consonants have no sound without being united with a vowel, and others have a very imperfect sound: hence some are called *mutes*, and others *semi-vowels*.

CONSONAN'TE (harmonious: *Ital.*), in Music, an epithet for all agreeable intervals.

CONSPIR'ACY (*conspiratio*, from *conspiro*, I plot with: *Lat.*), a combination of men for an evil purpose, or an agreement between them to commit some crime in concert.——In Law, it signifies an illegal compact to do something injurious to another.

CON'STABLE (*comes stabuli*, count of the stable: *Lat.*), a civil officer, anciently of great dignity; as the Lord High Constable of England, and also the constables or keepers of castles, &c. Constables of the

Tower, Dover Castle, and a few other places, are still appointed by the crown. It is now the title of an officer under the magistrates, for the preservation of the peace, whose duty principally consists in seizing and securing persons guilty of tumultuary offences. There are both high constables and petty constables; the former are chosen at the court-leets of the hundred over which they preside, or, in default of that, by the justices of the quarter sessions, and are removable by the same authority that appoints them. The duties of a high constable, as far as concerns the preservation of the peace, are now nominal. The petty constables were formerly chosen by the jury of the court-leet, or, if no court was held, they were appointed by two justices of the peace. At present, when any are appointed, they are chosen by the justices at petty sessions.——SPECIAL CONSTABLES are householders, or others, sworn in to act for a limited time, if the ordinary officers are not considered sufficient, by two justices of the peace, to whom information has been given on oath that a riot is expected, &c.——The LORD HIGH CONSTABLE of England had the care of the common peace, in deeds of arms, and matters of war. His power was so great and so improperly used, that it was abridged by Richard II., and was afterwards forfeited in the person of Edward Stafford, Duke of Buckingham, in 1521. This office is now filled up only for some solemn occasion, such as a coronation. The first Duke of Wellington was Lord High Constable at the coronations of George IV., William IV., and Victoria.

CONSTELLA'TION (*constellatio: Lat.*), an assemblage or system of several stars, expressed or represented under the name and figure of some animal or other object, as a bear, a ship, and the like; whence are derived those appellations which are employed in describing the stars. The division of the heavens into constellations is very ancient, probably coeval with astronomy itself. Modern astronomers divide the whole starry firmament into three parts, viz.: 1. The constellations in the zodiac; 2. the constellations north of the zodiac; and 3. the constellations south of the zodiac. 'The constellations' says Sir John Herschel, 'seem to have been almost purposely named and delineated to cause as much confusion and inconvenience as possible. Innumerable snakes twine through long and contorted areas of the heavens where no memory can follow them; bears, lions, and fishes, large and small, northern and southern, confuse all nomenclature. A better system of constellations might have been a material help as an artificial memory.' [See STARS.]

CONSTIT'UENT (*constituo*, I appoint: *Lat.*), in Politics, one who by his vote constitutes or elects a member of parliament. ——CONSTITUENTS, in Physics, the elementary or essential parts of any substance.

CONSTITU'TION (*constitutio*, from same: *Lat.*), in Politics, the collective body of the fundamental laws of a state, either contained in written documents or established by custom. Constitutions are either democratic, aristocratic, or of a mixed character. They are—1. *Democratic*, when the fundamental law guarantees to every citizen equal rights, protection, and participation, direct or indirect, in the government: such as the constitutions of the United States of America, and of some cantons of Switzerland. 2. *Aristocratic*, when the constitution establishes privileged classes, as the nobility and clergy, and entrusts the government entirely to them, or allows them a very disproportionate share of it: such a constitution was that of Venice. 3. *Of a mixed character*, when both the people and the aristocracy form integral and essential portions of the government; as in some monarchical constitutions, which recognize the existence of a sovereign and nobility, whose power is modified by other branches of the state, and is of a more or less popular cast. Of this kind is the BRITISH CONSTITUTION. It assigns the making of laws to the sovereign and the Houses of Lords and Commons, the sovereign being at the same time the executive power and personal representative of the nation: the House of Lords being a court of appeal from the courts of law, and the House of Commons the originator of all taxes and financial grants for the use of the executive. The constitution of Great Britain is a constitution of *principles*, not of *articles*; and however frequently it may have been violated by tyrants, monarchical, aristocratical, or democratical, the people have always found it expedient to restore the original, and from time to time they have been successful in improving it.——By the word CONSTITUTION is also meant a particular law, ordinance, or regulation, made by the authority of any superior; as the *constitutions* of Justinian and his successors, the *constitutions* of Clarendon, &c.——CONSTITUTION, in Medicine, the temperament of the whole body, arising from the quality and proportion of the parts. In this sense we speak of a robust or feeble constitution, a cold, phlegmatic, or sanguine constitution, &c.

CONSTRIC'TOR (*constringo*, I draw together: *Lat.*), in Anatomy an appellation given to several muscles on account of their contracting or closing some of the orifices of the body; as the *constrictor labiorum*, a muscle which constitutes the very substance of the lips and draws them together; or the *constrictor nasi*, a muscle arising above the *dentes incisores* of the upper jaw, and terminating in the *alæ* of the nose.

CONSTRUC'TION, in a general sense, the manner of putting together the parts of a building, or of a machine, &c.——In Grammar, *syntax*, or the proper arrangement of words in a sentence. Also, the manner of explaining the arrangement of words, or of understanding their purport.

CONSUBSTAN'TIAL (*consubstantialis: Lat.*), in Theology, an epithet signifying of the *same substance*: thus, in the articles of the Church of England, Christ is declared *consubstantial*, or of one substance with the Father.

CONSUBSTANTIA'TION (*con*, along with; and *substantia*, a substance: *Lat.*), a tenet of the Lutheran church, the members of which maintain that after consecration of the sacramental elements, the body and blood of Christ are substantially present, *together with* the substance of the bread and wine. It is termed also *Impanation*, and differs from *transubstantiation*, in which bread and wine are supposed to be *changed into* the body and blood of Christ, nothing but their appearances remaining, a dogma of the Roman Catholic church.

CON'SUL (*Lat.*), the title of the two chief magistrates of Rome, whose power was, in a certain degree, absolute, but who were chosen only for one year. The authority of the two consuls was equal; yet the Valerian law gave the right of priority to the elder, and the Julian law to him who had the greater number of children; and this one was generally called *Consul major*, or *prior*. In the first ages of the republic they were elected from patrician families: but in the year of Rome 388, the people obtained the privilege of electing one of the consuls from their own body, and sometimes both were plebeians.——In French History, the consuls were those to whom, after the dissolution of the Directory in 1799, the provisional government was intrusted. Buonaparte, Cambacérès, and Lebrun were elected as *first*, *second*, and *third* consul respectively, with different degrees of authority, for ten years; but the influence of the first becoming gradually augmented, the transition to imperial dignity became easy to him: indeed, he had only nominally shared his authority with his colleagues.——In modern usage, the name *Consul* is given to an officer appointed to reside in a foreign country, to protect the interests of trade, and to aid his government in any commercial transactions with that country.

CONSULTA'TION (*consultatio*, from *consulto*, I deliberate: *Lat.*), a meeting for deliberation: thus, of *council*, for the purpose of considering the best way of carrying on a suit; of *physicians*, to determine the nature of the patient's disease, and the course to be pursued regarding it.

CONSUMP'TION (*consumptio*, from *consumo*, I waste away: *Lat.*), in Medicine, a word of very extensive signification, implying all disorders that bring decay or waste upon the constitution. But it is more particularly applied to the disease called *Phthisis pulmonalis*, a disorder seated in the lungs, attended with hectic fever, cough, &c. Hence the word *consumptive* is used to denote the incipient state of that disease, or a constitution predisposed to it.

CONTA'GION (*contagio*, from *contingo*, I touch: *Lat.*), that subtle matter which proceeds from a diseased person and communicates the malady to another: as in cases of small-pox, malignant fevers, &c., which are often communicated without contact.

CON'TEXT (*contextus*, connected with: *Lat.*), the parts of a discourse which precede or follow the sentence quoted; the sense of a dubious passage is often illustrated by the *context*.

CON'TINENT (*contineo*, I hold together *Lat.*), in Geography, a great extent of land, not disjoined or interrupted by a sea; or a connected tract of land of great extent, as the Eastern or Western continent.——CONTINENTAL POWERS, those whose territories are situated on the continent of Europe.

CONTINEN'TAL SYS'TEM, a term given to a plan devised by Napoleon to exclude this country from all intercourse with the continent of Europe; to prevent the importation of British manufactures and commerce; and thus to compel the English government to make peace upon the terms prescribed by him. The history of Napoleon's continental system begins with the decree of Berlin of Nov. 21, 1806, by which the British islands were declared to be in a state of blockade: all commerce, intercourse, and correspondence with them were prohibited; every Englishman found in France, or in any country occupied by French troops, was declared a prisoner of war; all property belonging to Englishmen was declared fair prize; and all trade in English goods was entirely prohibited. Great Britain immediately directed reprisals against the Berlin decree, prohibiting all neutral vessels from sailing from one port to another belonging to France or one of her allies, &c. This was met by counter-reprisals, and for a long time a fierce and most annoying system was carried on for the annihilation of British commerce, the effects of which are still felt from the rival products and manufactures on the continent, to which the system gave rise.

CONTOR'TED (*contortus*, twisted: *Lat.*), a term applied to twisted roots, like those of bistort; and to the æstivation of some petals, when one side of each overlaps the adjacent side of another.

CONTOR'TION (*contortio*: *Lat.*), in Medicine, a twisting or wresting of a limb or member of the body out of its natural situation; partial dislocation.

CONTOUR' (*contorno*: *Ital.*), in Painting, Sculpture, &c., the outline, or that line which defines or bounds a figure.

CONTOURNE' (turned away: *Fr.*), in Heraldry, an epithet for a beast standing or running with his face to the sinister side.

CON'TRABAND (*contra*, against; and *bando*, an edict: *Ital.*), in Commerce, is a term applied to such goods as are prohibited to be imported or exported, either by the laws of a particular state, by special treaties, or by the law of nations. Contraband of war means such articles as can in any way aid in carrying on the contest.——By the ancient law of Europe, a ship conveying any contraband article was liable to confiscation as well as the article. But in the modern practice of the courts of admiralty of this and other countries, a milder rule has been adopted, and the carriage of contraband articles is attended only with the loss of freight and expenses, unless when the ship belongs to the owner of the contraband cargo, or when the simple misconduct of conveying such a cargo has been connected with other aggravating circumstances.

CON'TRA-BASSO (*Ital.*), the largest kind of violin, termed a *double bass.*

CON'TRACT (*contractus*, from *contraho*, I draw together: *Lat.*), a covenant or agreement between two or more persons, with a lawful consideration or cause which binds the parties to a performance. Each party to a contract must be of sound mind at the time it was made, and, unless for necessaries, of age; and, if a woman, generally speaking she must be unmarried. The considerations are either future marriage, since performed; or money, or something capable of being estimated in money; or some act or omission of an act, undoubtedly advantageous to the party in whose favour it was done or omitted: the act contracted for must not be unlawful. The agreement must be obtained neither by fraud nor compulsion; and it is sometimes vitiated by fraudulent acts committed subsequently to it. When it relates to an interest in land of three years' duration or more, or to goods of 10*l.* value or upwards, there must be earnest, or delivery, or a memorandum in writing, signed by the parties or their agents. When it is an agreement as surety, or upon marriage, as a consideration, it must be in writing, the want of the latter being, however, supplied in equity by partial performance.

CONTRAC'TILE FORCE (same *deriv.*), that property or power inherent in certain elastic bodies, on account of which, after having been extended, they reduce themselves again to their former dimensions, if permitted to do so.

CONTRAC'TION (*contractio*, from same), in a general sense, the diminishing the extent or dimensions of a body.——In Surgery, the shrinking up of the muscles or arteries.——In Grammar, the reducing two syllables into one by the omission of a letter or syllable.

CONTRA-INDICA'TION (*contra*, in opposition to; and *indicatio*, a pointing out: *Lat.*), in Medicine, an indication from some peculiar symptom or fact, that forbids the method of cure which the general tenor of the disease requires.

CON'TRAST (*contraste: Fr.*), in Painting, the due placing of the different parts and details of a figure, that they may be suitably opposed to each other.

CONTRAVALLA'TION (*contra*, over against; and *vallum*, a rampart: *Lat.*), LINE OF, in Fortification, a trench guarded with a parapet, thrown round a place by the besiegers, to defend themselves against the sallies of the garrison.

CONTRE (against: *Fr.*), in Heraldry, an epithet given to several bearings, on account of their cutting the shield contrary and opposite ways: thus we say *contre-bend*, *contre-chevron*, *contre-pale*, &c.

CONTRIBU'TION (*contributio*, from *contribuo*, I contribute: *Lat.*), in a general sense, the act of giving to a common stock. In a Military sense, money, &c., demanded from a country which is in the power of an enemy, under various pretences, and for various purposes, usually for the support of the army.

CONTROL'LER (*contrôleur: Fr.*), or COMPTROLLER, an overseer or officer appointed to control or verify the accounts of other officers. There is a comptroller of the household in the royal establishment, who carries a white staff, and has the charge of checking and examining all the expenses of the household.

CON'TUMACY (*contumacia*, stubbornness: *Lat.*), in Law, a refusal to appear in court when legally summoned, or other disobedience to its rules and orders.

CO'NUS (*kōnos*, a cone: *Gr.*), an extensive genus of univalve molluscs, having very thick shells, rolled up in the form of a cone. They are found chiefly in the southern and tropical seas. Many of them afford shells of great beauty, which sometimes bring very large prices. As much as 50*l.* has been given for a single specimen of *Conus gloria maris.*

CONVALES'CENCE (*convalescentia*, from *convalesco*, I grow strong: *Lat.*), the insensible recovery of health and strength after disease.

CONVALLA'RIA (from Lilium *Convallium*, the lily of the valley: *Lat.*), in Botany, a genus of plants belonging to the nat. ord. *Liliaceæ*, and including the lily of the valley.

CONVEN'TICLE (*conventiculum*, the *dim.* of *conventus*, an assembly: *Lat.*), a private assembly or meeting for the exercise of religion. The word was at first an appellation of reproach for the religious assemblies of Wickliffe, in the reigns of Edward III. and Richard II., and is now usually applied to a meeting of dissenters from the established church.

CONVEN'TION (*conventio*, a meeting: *Lat.*), in Law, an extraordinary assembly of the estates of the realm.——In Military affairs, an agreement entered into between two bodies of troops opposed to each other; or an agreement previous to a definite treaty.——NATIONAL CONVENTION, the name of the assembly by which the government of France was conducted during a period of the revolution.

CONVER'GING (*con*, together with; and *vergo*, I incline: *Lat.*), tending to one point.——CONVERGING LINES, in Geometry, lines which continually approximate.——CONVERGING RAYS, in Optics, those rays that proceed from different points of an object, and incline towards one another until they meet.——CONVERGING SERIES, in Mathematics, that in which the magnitude of the several terms gradually diminishes.

CON'VERSE (*conversus*, turned round: *Lat.*), a proposition in which the terms have been transposed. Thus, 'some boasters are cowards,' and 'some cowards are boasters,' are converse propositions.

CONVER'SION (*conversio*, a change: *Lat.*), in Logic, conversion takes place in a proposition when its terms are transposed.——CONVERSION OF EQUATIONS, in Algebra, the reducing of a fractional equation into an integral one.——CONVERSION OF A PROPOSITION, in Logic, is a changing of the subject into the place of the predicate, and still retaining the quality of the proposition.

CON'VEX (*convexus: Lat.*), rising or

swelling on the exterior surface: thus, a *convex* lens or mirror, which bulges at the middle.

CONVEY'ANCE (*conveho*, I carry: *Lat.*), in Law, a deed or instrument by which lands, &c., are conveyed or made over to another.

CONVEY'ANCER (same *deriv.*), one who professes to draw deeds, mortgages, and conveyances of estates.

CON'VICT (*convaincre*, to convict: *Fr.*), in Law, a person found guilty of a crime alleged against him, either by the verdict of a jury, or some other legal decision.

CONVIC'TION (same *deriv.*), the act of proving an accused person guilty of an offence charged against him, before a legal tribunal.

CONVOCA'TION (*convocatio*, from *convoco*, I call together: *Lat.*), an assembly of the clergy of England, whose powers at present are little more than nominal. In 1665, the clergy gave up the privilege of taxing themselves, on condition of being allowed to vote at elections of members of parliament; and since that time, convocation has seldom been allowed to do any business. Its province is supposed to be the enactment of canon law, subject to the licence of the king, and the examination and censuring of all heretical and schismatical books and persons; but from its judicial proceedings lies an appeal to the king in chancery, or his delegates. It is held during the session of parliament, and consists of an upper and a lower house: in the upper sit the bishops, and in the lower the inferior clergy, who are represented by their proctors, and all the deans and archdeacons. It is prorogued from time to time.

CONVOLU'TE (*convolutus*, from *convolvo*, I roll together: *Lat.*), in Botany, that which is rolled upon itself.

CONVOL'VULUS (*Lat.*, from same), in Botany, a genus of plants of the nat. ord. *Convolvulaceæ*, including the Bindweed of our hedges, and several handsome climbing plants cultivated in gardens.

CON'VOY (*convoi*: *Fr.*), ships of war which accompany merchantmen in time of war, to protect them from the attacks of the enemy. ——By land, any body of troops which accompany provisions, ammunition, or other property, for protection.

CONVUL'SION (*convulsio*, from *convello*, I rend: *Lat.*), in Medicine, a writhing and agitation of the limbs, and involuntary action of the muscles in general. Sometimes the whole body is attacked, in which case the mind is affected. The fits are often preceded by dizziness, double or disturbed vision, and coldness; and are followed by great languor. Their cause is not fully understood; but they are supposed to be due to some change in the brain, spinal marrow, or nerves.

COOT, in Ornithology, a British water-bird, belonging to the genus *Fulica*, amongst the *Grallatores*. The long toes have membranes at the sides, forming rounded lobes. The plumage is black, with a white line across the wing. It is closely allied to the moor hen.

COPA'IBA or COPI'VI, BALSAM OF, a liquid resinous juice, employed medicinally, flowing from incisions made in the stems of several South American trees, belonging to the genus *Copaifera*, nat. ord. *Leguminosæ*.

COPAL', improperly called gum-copal, is a resin, the concrete juice of various trees growing in tropical countries. Brazilian copal is obtained from some leguminous trees of genus *Hymenæa*. Copal greatly resembles amber in appearance: it is hard, transparent, and odoriferous, and makes an excellent varnish.

COPAR'CENERS. [See PARCENERS.]

COPER'NICAN SYSTEM, that system of the universe which was anciently taught by Aristarchus of Samos, in the first half of the third century B.C., and afterwards revived by Copernicus, a Polish astronomer. According to it, the sun is supposed to be placed in the centre, and all the other bodies to revolve round it in a particular order; which theory is now universally adopted, under the name of the solar system.

CO'PING (*cop*, the head: *Sax.*), in Masonry, the covering on the top of a wall. It is usually of stone, and projecting, to carry off the rain.

COP'PER (*cuprum*, corrupted from *Cyprium*; from the island of Cyprus, whence it was originally brought: *Lat.*), a metal known from the most remote antiquity, and, before iron was in use, employed as an alloy, for swords, domestic utensils, &c. It is of a pale red colour; its specific gravity is 8·6; it requires a temperature of about 2000° Fahr. for fusion. It is usually found as an ore; the most common being some form of pyrites, a compound of the sulphurets of copper and iron. It is not unfrequently obtained native in small and slender fibres, and sometimes in little globular and irregular masses. Next to gold, silver, and platina, it is the most ductile and malleable of the metals: it is more elastic than any metal except steel, and is the most sonorous of all the metals. Copper in sheets is much used for covering the bottoms of ships, for boilers and other utensils; mixed with tin, it forms bell-metal and bronze; with zinc, it forms brass, pinchbeck, &c. Great Britain has numerous copper mines, in Cornwall, Devonshire, Wales, &c., but particularly in the first. Though known long before, the Cornish copper mines were not wrought with much spirit till the last century. From 1726 to 1735, the Cornwall and Devon mines produced, on an average, about 6480 tons per year of *copper ore*; during the ten years, from 1776 to 1785, they produced, on an average, 30,413 tons; from 1796 to 1805, 56,403 tons; and the quantity now amounts to 162,000, worth nearly 1,000,000*l.* sterling! In 1768, the famous mines in the Paris mountain, near Amlwch, in Anglesea, were discovered. The supplies of ore furnished by them were for a long time abundant beyond all precedent; but, for many years past, their productiveness has been declining, and they now yield comparatively little copper. At present, the entire annual produce of the copper mines of England, Wales, Scotland, and Ireland, may be estimated at about 15,000 tons of copper. Large quantities of copper are brought to us from Australia. The Burra Burra mines, near Adelaide, are the most productive in the world. Swansea is the great copper port, and there are large smelting works there.

COP'PER-PLATE, a plate of copper, on which figures are engraved; also, the impression taken from that plate. Copper-plate printing is performed by means of what is called a rolling-press. The engraved plate is covered with ink, made of oil and Frankfort black, then cleanly wiped on the smooth parts, and laid on wet soft paper; and, on being passed between two cylinders with great force, the impression of the engraved part is perfectly transferred to the paper.

COP'PERAS, commonly called *green vitriol*, is sulphate of iron, a salt of a peculiar astringent taste, and of various colours, though most usually green. If sulphuric acid be diluted with water, and poured upon iron, much effervescence will be perceptible; the metal will be dissolved, and the solution, when evaporated, will yield sulphate of iron, or common copperas. It is made on a large scale by exposing iron pyrites, which is a bisulphuret of iron, to the action of the atmosphere, from which it absorbs oxygen, and thereby produces the sulphate which is dissolved out by water. Copperas is the basis of many dyes; it gives, with logwood, a fine black.

COP'PICE, or COPSE (*coupeaux*, from *couper*, to cut: *Fr.*), a wood of small growth, cut at certain times for fuel, &c.

COPRO'LITES (*kopros*, dung; *lithos*, stone: *Gr.*), the fossil dung of extinct animals. They are ground along with fossil bones, and employed as manure by farmers.

COP'TIC, the language of the Copts, or anything pertaining to that people, a sect of Christians, descendants of the ancient Egyptians, who derive their name from *Coptos*, in Egypt.

COP'ULA (a tie: *Lat.*), the word or words that connect the terms of a proposition. It may be affirmative, as: 'truth *is* our aim;' or negative, as: 'pain *is not* to be desired.'

COP'ULATIVE PROPOSI'TIONS (same *deriv.*), in Logic, those in which the subject and predicate are so linked together, by copulative conjunctions, that they may be all severally affirmed or denied one of another. Thus, 'Science *and* literature enlighten the mind, *and* greatly increase our intellectual enjoyments.'

COP'Y(*copie*: *Fr.*), in Law, the transcript of any original writing, as the copy of a patent, charter, deed, &c. A common deed cannot be proved by a copy or counterpart, where the original may be procured. But if the deed be enrolled, an attested copy may be given in evidence.——COPY is also used for the imitation of an original production, more particularly in painting and other branches of art.——COPY, among Printers, denotes the manuscript or original of a book, given to be printed.

COP'YHOLD, a tenure of landed property, by which the tenant holds his land by copy of court-roll of the manor, at the will of the lord, or rather, according to the custom of the manor of which such estate is parcel. The lands of a copyholder, though substantially his own, are, nominally, a part of the lord's demesne.

COP'YRIGHT, the exclusive right of printing and publishing copies of any literary performance, vested either in the author, or in those to whom he may have assigned it. By a recent enactment, the copyright of every volume, part, or division of a volume, pamphlet, sheet of letter-press, sheet of music, map, chart, or plan, separately published, in the lifetime of its owner, shall endure for his natural life, and seven years longer; or, if the seven years shall expire before the end of forty-two years from the first publication, shall endure for forty-two years. When the work is posthumous, it shall endure for forty-two years from the first publication, and shall belong to the owner of the manuscript. No action regarding copyright can be commenced without previous registration of the work at Stationers' Hall. Under some recent statutes, a copyright may be secured by registration in certain articles of ornamental and useful designs, for periods varying from nine months to three years. The designs must be new, and drawings of them, or patterns, must be lodged in a special government office.

CO'QUILLA NUT, the hard covering of the kernel of a Brazilian palm, *Attalea funifera*. It is used for making umbrella handles, and other similar articles.

COR'ACLE (*Welsh*), a small boat, used by the fishermen of Wales, constructed of wicker, and covered with leather. It has descended from the times of the ancient Britons to the present day.

COR'ACOID (*korax*, a crow; and *eidos*, form: *Gr.*), in Anatomy, a small sharp process of the scapula, shaped like a crow's beak.

COR'AL (*korallion*: *Gr.*), a substance which is usually branched, formed by marine zoophytes, soft-bodied tentacled animals, bearing much resemblance to sea-anemones. There is a great number of species of coral, varying greatly in shape, texture, and colour. Some are stony and inflexible; others of a horny structure, and flexible. [See ANTIPATHES.] Some of the latter have their branches coated with carbonate of lime [see GORGONIA]; others are naked. Of the stony species, some are very porous, others so compact and hard that they will take a good polish, and of this nature is the coral of commerce, which is wrought into ornaments of many forms. The Brain-stone, one of these stony corals, is rounded and destitute of branches. In many corals, the zoophytes, which secrete the hard substance we term coral, reside in hollows or cells scattered over the whole surface. In others, they live in cups at the ends of the branches. The exact mode in which the coral is produced is not known. To return to the coral of commerce, the 'fishery' is carried on extensively in the Mediterranean. The coral is attached to submarine rocks, by the base of the main stem. For this kind of fishing, eight men, who are excellent divers, equip a felucca, or a small boat, commonly called a coralline; carrying with them a large wooden cross, with strong, equal, and long arms, each bearing a stout bag-net. They attach a strong rope to the middle of the cross, and let it down horizontally into the sea, having loaded its centre with a weight sufficient to sink it. The diver follows the cross, pushes one arm of it after another into the hollows of the rocks, so as to entangle the coral in the nets; after which his comrades in the boat pull up the cross and its accompaniments. Coral is usually of a fine red: but it is sometimes flesh-coloured, yellow, or white.

COR'AL ISLANDS, and REEFS. In the Pacific and Indian oceans there is an immense number of islands which owe their existence wholly or in great part to coral zoophytes, which have also formed extensive reefs, that is, sub-marine walls of the same calcareous material. Many fishes browse upon corals, and a great number of worms and shell-fish bore into the stony mass. Thus, in process of time, much fine mud is formed, which sinks to the bottom of the sea, and there constitutes beds, which would bear great resemblance to chalk if elevated into land. These structures have been classed as:—1. *Atolls*, or Lagoon islands, circular walls of coral enclosing a piece of quiet water. [See ATOLL.] 2. *Barrier reefs*, which extend in a linear direction near land. A reef of this kind, 1200 miles long, stands twenty or thirty miles from the north-east coast of Australia, and stretches almost across Torres Straits. Off New Caledonia is another reef 400 miles long. 3. *Shore or Fringing reefs*, which form a ribbon or fringe round the shore of an island. It has been ascertained that the animals which form these masses of coral cannot work below a depth of thirty fathoms, nor above the surface of the water. They belong to the families of Madreporidæ, Astræidæ, and Oculinidæ, and are quite different from the coral of commerce. It is generally believed that the different appearances presented by coral islands and reefs are connected with extensive subterranean movements of the earth's crust, and Mr. Darwin's theory, which has met with the acceptance of scientific men, is that atolls have their foundation on land that has slowly subsided, and part of which was once above the level of the sea; that barrier reefs prove that the land is also sinking; whilst fringing reefs testify that the land is either rising or stationary. In many of the Sandwich islands, old reefs are to be seen at a considerable height above the sea, and these afford examples of fringing reefs.

COR'AL TREE, the English name of some leguminous trees and shrubs, belonging to the genus *Erythrina*. They are natives of India, Africa, and America, and have handsome scarlet flowers.

CORAL'LIFORM (*corallium*, coral; and *forma*, a form: *Lat.*), forked, crooked, and irregular, like coral.

COR'ALLINES (*corallium*, coral: *Lat.*), small marine plants which grow on the shore near low water mark. They have many jointed branches, and their tissues are so charged with carbonate of lime that they were long thought to be of animal origin. The lime may be removed by means of weak acid, leaving the vegetable matter behind. *Corallina* and *Jania* are the two best known genera.——CORALLINE is also a small boat used in the coral fisheries.

COR'BEIL (*corbeille*, a basket: *Fr.*), in Fortification, a basket which is filled with earth, and set upon a parapet, to shelter men from the fire of besiegers.

COR'BEL (same *deriv.*), in Architecture, a short piece of timber in a wall, jutting out six or eight inches, in the manner of a shoulder-piece, and sometimes placed for strength under the semi-girder of a platform. It is often in the form of a basket, or some other ornament.——Also the carved bosses, or projecting stones, frequently seen in Gothic churches at the spring of the arches.——CORBEL TABLE, a projecting battlement, parapet, or cornice, resting on corbels.

COR'CULUM, or COR'CULE (a *dim.* of *cor*, the heart: *Lat.*), in Botany, a name for the embryo of the seed.

COR'DAGE, every description of ropes and lines used on shipboard; but more particularly that employed in the running rigging of a ship.

COR'DATE (*cor*, the heart: *Lat.*), a term used by naturalists for heart-shaped. Thus, in Botany, a *cordate leaf* means one which has a pair of rounded lobes at the base, with the stalk inserted between them, the other end of the leaf being acute.

CORDELIE'R (*corde*, a rope: *Fr.*), in Church History, a grey friar, or monk of the order of St. Francis. The Cordeliers wear a white girdle, which is a rope tied with three knots, and called the *cord of St. Francis*.

CORDELIE'RS. This word, as we have just seen, originally signified an order of Franciscan monks; but it was afterwards applied to a society of Jacobins which existed in France from 1792 to 1794, and were so called from their place of meeting. They were distinguished by the violence of their speeches and conduct, and contributed not a little to the execrable crimes which disgraced the French name and nation during the early periods of revolutionary anarchy.

CORDILLE'RA (*Span.*), a chain of mountains, applied to the range of the Andes.

COR'DON (a string: *Fr.*), in Fortification, a row of stones projecting from the rampart, at the basis of the parapet. The word cordon is also used to denote a line or series of military posts. Cordon signifies likewise a riband; as, the *cordon bleu*, the badge of the French order of the Holy Ghost.

COR'DOVAN, leather made of goatskin, and named from Cordova in Spain.

CORIA'CEOUS (*corium*, a hide: *Lat.*), stiff, like leather; a botanic term for leaves, capsules, &c., when of that texture.

CORIAN'DER (*koris*, a bug: *Gr.*), the *Coriandrum sativum* of Linnæus, an annual plant, belonging to the order of *Umbelliferæ*, the seed of which, when dry, is an agreeable aromatic, but, when fresh, has the smell of a bug: whence its name. It is one of the ingredients of *curry powder*.

CORIA'RIA (*corium*, a hide: *Lat.*, from its use in tanning), in Botany, a genus of shrubby plants, nat. ord. *Coriariaceæ*. The Toot poison of New Zealand is extracted from one species. The same and other species yield a black dye.

CORIN'THIAN, pertaining to Corinth, a celebrated city of Greece.——CORINTHIAN ORDER, in Architecture, the noblest and richest of the five orders. The capital of the column is adorned with two rows of leaves, between which arise little stalks, or caulicoles, forming sixteen volutes. [See COLUMN.]

CO'RIUM (*Lat.*), in Anatomy, the innermost layer of the skin in mammals, termed also the *cutis vera*. [See SKIN.]

CORK (*kork*: *Germ.*), the outer covering (*epiphlœum*) of the bark of the *Quercus Suber*, a tree which grows abundantly in Spain, Italy, and France. It is obtained by making an incision down the whole height of the trunk, and, at each extremity of this, another round the girth. The tree is supplied with this coat so abundantly that it not only continues to flourish uninjured by the act of barking, but, in its natural state, regularly sheds the old, and acquires a new covering. Cork is light, porous, nearly impervious to most liquors, and elastic; qualities which render it superior to all other substances for stoppers of bottles, in the manufacture of which it is principally used. It is also employed for buoys to float nets, in the construction of life-boats, the making of waterproof shoes, and in various other ways. The uses of cork were well known to the ancients, and were nearly the same as those to which it is applied by us.

CORM (*kormos*, a stump: *Gr.*), in Botany, an underground stem in the nature of a solid bulb, such as the gladiolus and tulip have.

COR'MORANT (*cormoran*: *Fr.*; from *corvus marinus*, a sea crow: *Lat.*), an exceedingly voracious genus (*Phalacrocorax*) of palmipede birds, found in every climate. They are excellent divers, but are very awkward on land, on account of their legs being placed far back. They fly, however, with great rapidity. They build on the highest cliffs hanging over the sea, and feed on fish, among which they make great havoc. Some of the species have been trained for fishing, particularly in China. There are two British species: the great Cormorant, and the Shag or Green Cormorant.

CORN (*korn*: *Germ.*), farinaceous seed, as that of wheat, rye, barley, oats, and maize. In short, it comprehends all the kinds of grain which constitute the food of men and horses.——CORN, in Surgery, an excrescence, or hard tubercle, like a flat wart, growing in the feet, especially upon the joints of the toes. Corns are usually produced by the pressure of tight or narrow-toed shoes, especially if a person is obliged to stand or walk much, and may be cured by removingthe pressure.

COR'NEA (*cornu*, horn: *Lat.*), in Anatomy, the transparent membrane in the forepart of the eye, through which the rays of light pass.

COR'NET (*cornette*, a *dim.* of *corne*, a horn: *Fr.*), an instrument very similar to a trumpet, which is used in the army.——CORNET (*cornetta*, a small flag: *Ital.*), the lowest commissioned officer in a troop of cavalry, answering to an ensign in a troop of foot. He bears the colours. His rank, or commission, is called a *cornetcy*.

CORN-FLAG, in Botany, the wild Gladiolus, nat. ord. *Iridaceæ*.

COR'NICE (*corniche*: *Fr.*; from *corona*, a crown: *Lat.*), in Architecture, the uppermost member of the entablature; or any moulded projection that crowns or finishes the part to which it is affixed; as, the cornice of a room, a door, &c.

CORNIC'ULATE (*corniculum*, a little horn: *Lat.*), in Botany, bearing a little spur or horn.

COR'NU AMMO'NIS (the horn of *Ammon*), a fossil shell, belonging to the genus *Ammonites*, bearing some resemblance in shape to a ram's horn.

CORNUCO'PIA (*cornu*, a horn; and *copia*, abundance: *Lat.*), or HORN OF PLENTY, the source whence, according to the ancient poets, every production of the earth was poured out abundantly: a gift from Jupiter to his nurse, the goat Amalthea. In elucidation of this fable, it has been said that in Libya, a part of ancient Africa, there was a small and fertile territory, somewhat resembling a bullock's horn in shape, which Ammon bestowed on his daughter Amalthea, the nurse of Jupiter. Upon medals, the cornucopia is given to all deities, genii, and heroes, to mark the felicity and abundance procured through the goodness of the former, or the care and valour of the latter.

COR'NUS (the cornel tree: *Lat.*), a genus of shrubs and trees, nat. ord. *Cornaceæ*, to which the dogwood, a well-known British shrub, belongs.

COROL'LA, or COR'OL (*corolla*, a garland: *Lat.*), in Botany, one of the whorls of leaves which surround the organs of fructification. There are usually two such whorls, the outer being the calyx, the inner the corolla, and this is frequently gaily coloured. Sometimes the calyx and corolla are undistinguishable, as in the lily and iris, in which case perianth is the term used. Each leaf of the corolla is called a petal; and, according as there is one, two, or three of these petals, the corolla is said to be *monopetalous*, *dipetalous*, *tripetalous*, &c. [See BOTANY.]

COR'OLLARY (*corollarium*, a deduction; literally, a wreath of flowers: *Lat.*), a conclusion, or consequence drawn from premises, or from what is advanced or demonstrated.

CORO'NA (a crown: *Lat.*), in Architecture, a large flat member of a cornice, very frequently called the *drip*, or *Larmier*. It is situated between the cymatium and the bed moulding, and its use is to carry off the water, drop by drop.——In Botany, the series of processes in the throat of the flowers of Narcissus and other allied plants. They are considered to be sterile stamens. ——In Optics, a halo, or luminous circle, round the sun or moon.——In Zoology, the exposed part of a tooth, which projects beyond the alveolus or gum.

CORONA'LIS SUTU'RA (the coronal suture: *Lat.*), in Anatomy, the first suture of the skull, which reaches transversely from one temple to the other, and joins the *os frontis* to the *ossa parietalia*.

COR'ONARY (*coronarius*, pertaining to a crown: *Lat.*), in Anatomy, the vessels, &c., which spread round certain viscera, bones, &c. Thus, CORONARY VESSELS are those which furnish the substance of the heart with blood.——CORONARY ARTERIES, two arteries springing out of the *aorta*, before it leaves the *pericardium*.——CORONARY VEIN, a vein diffused over the exterior surface of the heart. It is formed of several branches arising from all parts of that organ, and terminates in the *vena cava*, whither it conveys the blood brought by the coronary arteries.

CORONA'TION (*corona*, a crown: *Lat.*), the public and solemn ceremony of crowning, or investing a prince with the insignia of royalty, in acknowledgment of his right to govern the kingdom; at which time the prince swears reciprocally to the people to observe the laws, customs, and privileges of the kingdom, and to act in all things conformably to them. The form of the coronation oath of a British monarch is as follows: 'I solemnly promise and swear to govern the people of this United Kingdom of Great Britain and Ireland, and the dominions thereto belonging, according to the statutes in parliament agreed on, and the laws and customs of the same; to the utmost of my power to maintain the laws of God, the true profession of the gospel, and the Protestant reformed religion established by the law; to preserve unto the bishops and the clergy of this realm, and the churches committed to their charge, all such rights and privileges as by law do or shall appertain unto them or any of them.' After this, the king or queen, laying his or her hand upon the holy Gospels, says, 'The things which I have before promised, I will perform and keep; so help me God.' Our sovereigns, from Harold down to Queen Victoria, have been crowned at Westminster. The actual imposition of the crown, by the Archbishop of Canterbury, whilst the sovereign is seated in the ancient wooden chair preserved in the abbey, has of late years taken place within the sacrarium in front of the altar before St. Edward's Chapel. After being crowned, the sovereign receives the homage of the officers of state and nobility.

COR'ONER (same *deriv.*, because an officer of the crown), the officer presiding over a jury convened to inquire into the cause of sudden deaths. The lord chief justice of the Queen's Bench is the chief coroner for the whole kingdom. Coroners are elected by the freeholders of counties, and hold their appointments for life.

COR'ONET (a *dim.*, from *corona*, a crown: *Lat.*), in Heraldry, a small crown worn by the nobility. The coronet of a duke is adorned with eight strawberry leaves; that of a marquis has four strawberry leaves alternating with four pearls; that of an earl has eight strawberry leaves, alternating with eight pearls, raised on points; that of a viscount has sixteen pearls; and that of a baron only six pearls. The last does not appear to have worn a coronet earlier than the reign of Charles II.——CORONET, or CORONET BONE, in Farriery, the second of the consolidated phalanges of the horse's foot; the upper part of his hoof.

CORO'NOID PROCESS, in Anatomy. [See CONDYLOID.]

COR'PORAL (*caporal*: *Fr.*; from *capo*, a head: *Ital.*), the lowest non-commissioned officer in a company of foot, who commands one of the divisions, places and replaces sentinels, &c.; at drill, he has charge of a *squad*; in the ranks he does the duties of a private, but his pay is a little higher.——CORPORAL, in Law, an epithet for anything that belongs to the body, as *corporal punishment*, or a *corporal oath*—so called because the party taking it is obliged to lay his hand on the Bible.

CORPORA'TION (*corpus*, a body: *Lat.*), a body politic or corporate, so called because the persons or members are joined into one body, and authorized by law to transact business as an individual. Corporations are either sole or aggregate. *Sole corporations* consist of a single person: such is the parson, in respect to his benefice. *Corporations aggregate* consist of more than one, and are kept up by a continued succession of members. Corporations are also either *ecclesiastical* or *lay*. Parsons, bishops, chapters, &c., constitute the former. The latter are either *civil* or *eleemosynary*. Among the first are trading companies, &c.; among the second, hospitals, colleges, &c. The chief incident of a corporation is the power of taking land by succession. Corporations are established either by prescription, letters patent, charter, or act of parliament; but most commonly by patent or charter. The municipal corporations of boroughs were established by an act of parliament, 5 & 6 Wm. IV. cap. 76 (1835).

CORPS (*Fr.*), a body of troops, any division of an army; as, a *corps de reserve*, the troops in reserve; *corps de bataille*, the whole line of battle, &c.

COR'PUS (a body: *Lat.*), in Anatomy, a name given to several substances or parts of the human body. In legal phraseology, the corpus of a fund is the capital exclusive of interest.

COR'PUS CHRIS'TI DAY (*corpus Christi*, the body of Christ: *Lat.*), a festival instituted by the Church of Rome in honour of the sacrament of the Lord's Supper, in which it maintains that Christ is *corporeally* present.

CORPUS'CULAR PHILOS'OPHY (*corpusculum*, an atom: *Lat.*), that philosophy which endeavours to account for the phenomena of nature, by the motion, figure, rest, position, &c., of the minute particles of matter.

COR'PUSCULE (*corpusculum*, a *dim.* of *corpus*, the body: *Lat.*), a minute particle or physical atom.

CORREL'ATIVE (*con*, together and *relatus*, relative: *Lat.*), an epithet denoting the having a reciprocal relation, so that the existence of one in a certain state depends on the existence of another; as, father and son ; light and darkness ; motion and rest. 'Every right supposes a correlative obligation, but every obligation does not create a right correlative to it.'

COR'RIDOR (*corridoro : Ital.*), in Architecture, a gallery or long passage round a building, leading to several chambers at a distance from each other.——In Fortification, the covered way lying round the whole compass of the fortifications of a place.

CORROB'ORANT (*corroboro*, I strengthen : *Lat.*), of a strengthening nature ; as a *corroborant* medicine.

CORRO'SION (*corrodo*, I gnaw in pieces : *Lat.*), the action of eating or wearing away by slow degrees, as when acids act on metals, &c.

CORRO'SIVE SUB'LIMATE (same *deriv.*), *bichloride of mercury* ; an extremely acrid and poisonous preparation. White of egg is useful in preventing its poisonous effects.

COR'RUGATOR (*corrugo*, I wrinkle : *Lat.*), a muscle which contracts the skin of the forehead into wrinkles.

COR'SAIR (*corsaro : Ital.*), a name commonly given to the piratical cruising vessels of Barbary, which, from the beginning of the 16th century to a recent period, infested the Mediterranean.

CORS'ELET (*Fr.*), in Natural History, that part of the underside of crustaceans and insects which is between the insertion of the legs.——Also, a small cuirass.

CORTE'GE (*Fr.*), a word signifying the train or retinue that accompanies a person of distinction.

COR'TES, the two constitutional houses of peers and deputies in Spain and Portugal, answering to the houses of lords and commons in Great Britain.

COR'TEX (*Lat.*), the outer bark of a plant.

COR'TICAL (same *deriv.*), consisting of bark or rind ; belonging to the external covering, as the *cortical* part of the brain.

CORUN'DUM (*Ind.*), a mineral of the sapphire kind, which is found in the East Indies. It is composed of nearly pure alumina.

CORUSCA'TION (*coruscatio*, a flashing : from *corusco*, I glitter : *Lat.*), a sudden flash of light.

CORVET'TE (*Fr.*), a vessel of war carrying less than twenty guns.

COR'VIDÆ (*corvus*, a crow : *Lat.*), a family of birds belonging to the order of *Passeres*, including the crow, raven, jay, nutcracker, and many other birds.

CORVUS, in Antiquity, a military engine, invented by the Romans at the time of their wars in Sicily, when they first engaged the Carthaginian fleet. It consisted of a strong platform of boards at the prow, movable as on a spindle, and thrown over the side of an enemy's vessel when grappled, the object being to enable the Romans to board the Carthaginian ships.

CORYBAN'TES (*Korubantes : Gr.*), in Antiquity, priests of the goddess Cybele, celebrated for their wild and extravagant attitudes in dancing, &c.

COR'YMB (*korumbē*, a cluster of berries : *Gr.*), in Botany, a species of inflorescence in which the lower flower stalks are produced, so as to rise nearly to the same height as the upper and middle flowers, and thus they are all brought almost to the same level. The umbel differs from the corymb by having all the flower stalks radiating from the same point.

CORYPHÆ'NA (*korus*, a helmet; and *phaino*, I show : *Gr.*), in Ichthyology, a genus of acanthopterygious fishes, so called from the head being like a helmet. It includes the dolphin, the *Coryphæna Hippurus*.

CORYPHÆ'US (*koruphaios*, from *koruphē*, the summit : *Gr.*), the leader of a chorus.

COSE'CANT (*abbrev.* for *complement-secant*), in Geometry, the secant of an arc which is the complement of another, or what it wants of ninety degrees.

CO'SINE (*abbrev.* for *complement-sine*), in Geometry, the sine of an arc which is the complement of another. [See COSECANT.]

COSMET'IC (*kosmeo*, I adorn : *Gr.*), any preparation that renders the skin soft and white, or helps to beautify and improve the complexion.

COS'MICAL (*kosmikos*, from *kosmos*, the world : *Gr.*), relating to the whole system of the world. In ancient Astronomy, the word was used to denote a particular position of a planet or star, at its rising or setting, with respect to the sun. A planet is said to rise or set *cosmically* when it rises or sets at the same instant with that luminary. *Cosmical* is opposed to *acronycal*, which means that the planet rises when the sun sets, and *vice versâ*. The cosmical and acronycal rising of a planet or star are invisible on account of the sun's rays.

COSMOG'ONY (*kosmogonia* : from *kosmos*, the world ; and *gonos*, birth : *Gr.*), in Physics, the theory of the formation of the world.

COSMOG'RAPHY (*kosmographia* : from *kosmos*, the world ; and *grapho*, I write : *Gr.*), a description of the world or universe : or the mode of describing the several parts of the visible world.

COS'MOLABE (*kosmos*, the world ; and *labē*, a taking : *Gr.*), an ancient instrument, very similar to the astrolabe, for measuring distances in the heavens or on the earth.

COSMOL'OGY (*kosmos*, the world ; and *logos*, a discourse : *Gr.*), a treatise relating to the structure and parts of creation, the elements of bodies, the laws of motion, and the order and course of nature.

COSMOP'OLITE (*kosmos*, the world ; and *politēs*, a citizen : *Gr.*), a citizen of the world ; one who makes himself at home everywhere.

COS'SACKS (armed warriors : *Tart.*), the tribes who inhabit the southern and eastern parts of Russia, Poland, the Ukraine, &c., paying no taxes, but performing instead the duty of soldiers. They form a kind of military democracy, and have proved highly serviceable, as irregular cavalry, in the Russian campaigns. Their principal weapon is a lance from ten to twelve feet in length ; they have also a sabre, a gun, and a pair of pistols, and sometimes a bow and arrows. Their lances, in riding, are carried upright by means of a strap fastened to the foot, the arm, or the pommel of the saddle. Those who use bows carry a quiver over the shoulder. Though little adapted for regular movements, they are very serviceable in attacking baggage or magazines, and in the pursuit of troops scattered in flight. They fight principally in small bodies, that attack the enemy on all sides, but mostly on the flanks and in the rear, rushing upon them at full speed, with a shout, and with levelled lances.

COST-BOOK SYSTEM of carrying on a mining adventure. In this system, the mine is vested in one or more persons in trust for the other shareholders as well as for themselves, and an agent who is termed the purser is appointed to manage the mine. It is his duty to enter in the 'cost-book' the names of the shareholders, the minutes of their meetings, the expenses and receipts, and the transfers of shares. Meetings of the shareholders are frequently convened, and those present consider the accounts and the purser's report, make calls, declare dividends, give directions as to the working of the mine, and exercise a general control over the adventure, the majority deciding any question in difference. Any shareholder may withdraw from the undertaking on giving notice to the purser and settling his accounts. The purser will then strike his name out of the book, and enter the name of the person to whom he has sold his share; the transfer is thus completed. There is seldom any deed of settlement. The advantage of the system consists in the frequency of the general meetings, and the controlling superintendence exercised by the shareholders over the officers and the proceedings in the mine. The accounts being regularly discharged, the partners are acquainted with the extent of their several liabilities.

COS'TUME (*Fr.*), in Painting and the fine arts generally, the observance of that rule by which an artist is required to make any person or thing sustain its proper character; the scene, dress, arms, manners, &c., all corresponding.

COTAN'GENT (*abbrev.* for *complement-tangent*), in Geometry, the tangent of an arc which is the complement of another. [See COSECANT.]

CO'TERIE (*Old Fr.*; from *quot*, how many: *Lat.*), a knot of persons forming a particular circle. At first, the term, according to some, was purely commercial, and signified an association in which each member furnished his *quota*, or part, and bore his share in the profit and loss.

COTHUR'NUS (*Lat.*; from *kothornos*: *Gr.*), in Antiquity, a kind of high-laced shoe, such as Diana and her nymphs are represented as wearing. It rose above the middle of the leg, and was used by horsemen, hunters, and men in authority; also by heroes in tragedy; in which case, to give them height, it had a sole of cork, of considerable thickness.

COT'TON (*coton*: *Fr.*), a soft, downy substance, consisting of fine hairs growing round the seeds of plants belonging to the genus *Gossypium*, nat. ord. *Malvaceæ*, several species of which, some herbaceous, some shrubby, grow in warm climates. Its chemical characters are those of *lignin*, and it is peculiarly susceptible of combination with certain metallic oxides or bases. The chief distinction between cottons in the pod is that of *black-seeded* and *green-seeded*. The former part with the hairs very readily to a pair of rollers, or the human arm; while the latter require to be *ginned*, by powerful machinery. The filaments vary in length, flexibility, tenacity, and thickness, in different cottons; whence the great difference in their value. It appears that the manufacture of cotton has been carried on in Hindostan from the remotest antiquity; and there it is still continued, by hand labour, in all its primitive simplicity. In England, however, during the last half-century it has become of immense importance. It has been remarked that the rapid growth and prodigious magnitude of the cotton manufacture of Great Britain are, beyond all question, the most extraordinary phenomena in the history of industry. Our command of the finest wool naturally attracted our attention to the woollen manufacture, and paved the way for that superiority in it which we have long since attained; but when we undertook the cotton manufacture, we had comparatively few facilities for its prosecution, and had to struggle with the greatest difficulties. The raw material was produced at an immense distance from our shores; and in Hindostan and China the inhabitants had arrived at such perfection in the arts of spinning and weaving, that the lightness and the delicacy of their finest cloths emulated the web of the gossamer, and seemed to set rivalry at defiance. Such, however, has been the influence of the wonderful discoveries and inventions of Hargraves, Arkwright, Crompton, Cartwright, and others, that we have overcome all these difficulties—that neither the extreme cheapness of labour in Hindostan, nor the excellence to which the natives had attained, has enabled them to withstand the competition of those who buy their cotton, and who, after bringing it 5000 miles to be manufactured, carry back the goods to them.—The following account of a pound of cotton may not be uninteresting to our readers. There was sent to London, from Paisley, a small piece of muslin, about one pound weight: the wool came from the East Indies to London; from London it went to Lancashire, where it was manufactured into yarn; from Manchester it was sent to Paisley, where it was woven; it was next sent to Ayrshire, where it was tamboured; it was then conveyed to Dumbarton, where it was hand-sewed, and again returned to Paisley, whence it was sent to Glasgow and finished, and thence to London. It may be reckoned that it took about three years to bring this article to market, from the time when it was packed in India till it arrived complete in the merchant's warehouse in London; it must have been conveyed 5000 miles by sea, and nearly 1000 by land, and have contributed to reward the labour of nearly 150 persons, whose services were necessary in the carriage and manufacture of this small quantity of cotton, and by which the value has been advanced more than 2000 per cent. In 1860 there came to England the following supplies of cotton: United States, 2,581,000 bales; Brazil, 103,000 bales; Egypt, 109,000 bales; West Indies, 1000 bales; East Indies, 563,000 bales; total, 3,357,000 bales. After that year, as is well known, the quantity of cotton imported from America greatly decreased in consequence of the civil war. When the cotton manufacture was at its height, upwards of 500,000 persons were actually employed in it, of whom 400,000 were in Lancashire. If to this number we add the engineers, mechanics, and workers in metal and wood, the shopkeepers and other tradespeople supported by them, altogether about 250,000 persons, and then take into consideration the women, children, and old relatives of the preceding, 250,000 people more, we shall arrive at a total of a million of persons who were dependent upon the cotton manufacture, and of these four-fifths were resident in Lancashire. In 1862 the value of the cotton goods exported was 42,141,089*l.*, and the value of exported cotton yarn was 9,870,875*l.*——COTTON GIN, a machine to separate the seeds from cotton. ——COTTON MILL, a mill or building with machinery for carding, roving, and spinning cotton, by means of either water or steam.

COT'TON-GRASS, the common name of the species of *Eriophorum* (*erion*, wool; and *phero*, I bear: *Gr.*), a genus of perennial plants, nat. ord. *Cyperaceæ*. The fruit is clothed with cotton-like fibres, of which paper and candle-wicks have been made.

CO'TYLA (*kotulē*, a cavity: *Gr.*), in Anatomy, any deep cavity in a bone, in which another bone is articulated; but the word is generally used to express the *acetabulum*, or cavity which receives the head of the thigh-bone.

COTYLE'DON (*kotulēdōn*, any cup-shaped cavity: *Gr.*), in Botany, the seed-lobe attached to the embryo. It nourishes the plumula and radicle during their first development, before they are able to subsist on organizable matter, absorbed from the earth. The two cotyledons of exogenous plants usually burst through the integuments, and show themselves above ground in the shape of temporary leaves, which have a different form from the subsequent leaves of the plant. Where the seed-lobes are fleshy, as in the bean, they often remain below the surface of the ground. A plant called Welwitschia has been lately found in South Africa, which never has any other leaves than its two cotyledonous leaves: in this respect it has no parallel in the vegetable kingdom. The seed-lobe of monocotyledonous plants never takes the shape of a leaf. [See DICOTYLEDONOUS.]

COUCH (*couche*, a layer: *Fr.*), in Painting, a term used for each lay or coating of colour, either in oil or water, upon the canvas, wall, or other matter to be painted. Gilders use the term *couch*, for gold or silver leaf laid on metals in gilding or silvering.

COUCH'-GRASS (*coucher*, to lie down: *Fr.*, because it creeps along), the *Triticum repens* of botanists, a grass which spreads very fast in arable land, and chokes everything else.

COUCH'ANT (lying down: *Fr.*), in Heraldry, lying down, but with the head raised; which distinguishes the posture of *couchant* from *dormant*, or asleep.——*Levant* and *couchant*, in Law, rising up and lying down, applied to beasts, and indicating that they have been at least one night on the land.

COUCH'ING (*coucher*, to put lying down: *Fr.*), one of the modes of operating in cases of cataract, by which the opaque crystalline lens is removed out of the axis of vision.

COUGH, a convulsive motion of the diaphragm, muscles of the larynx, thorax, &c.; expelling the air that was drawn into the lungs by inspiration, and carrying along with it the phlegm or irritating matter which causes the effort of the muscles. It is generally, if not always, symptomatic of other diseases. When it does not disappear within a short period it cannot be neglected with impunity.

COUN'CIL (*consilium*, literally a sitting together: *Lat.*), in Ecclesiastical History, an assembly of prelates and other spiritual persons for the regulation of ecclesiastical matters. It is either *national* or *œcumenical*:—in the latter, the whole body of the clergy throughout the world is supposed to be represented. Roman Catholics hold the decision of a general council infallible; and a large number of them believe it superior to the pope. But, since this doctrine has been asserted by councils, not only *theoretically*, but *practically* in the deposition of popes, the latter have been very unwilling to convene them; nor has there been one since the Council of Trent: and before making the *immaculate conception* an article of faith, the present pope merely demanded the opinions of the Roman Catholic prelates by letter. Protestants attach great importance to the first four general councils, viz. those of Nice, Constantinople I., Ephesus, and Chalcedon; but they altogether deny their infallibility.——COUNCIL, in National affairs, an assembly of persons who meet for the purpose of concerting measures of state. In England, the PRIVY COUNCIL is that in which the privy councillors meet to deliberate on affairs of state. When a council is composed only of cabinet ministers, it is called a *Cabinet Council*.——COUNCIL OF WAR, an assembly of the principal officers of a fleet or army, called by the admiral or general to concert measures for requisite operations.

COUNT (*comes*, a companion: *Lat.*), a title of foreign noiblity, equivalent to earl with us. It is very ancient, having been in existence since the time of Augustus; but in most of the continental states it has degenerated very much, and in some—for example, the papal—it may be bought very cheaply.——In Law, a particular charge in an indictment, or narration in pleading, setting forth the cause of complaint. There may be different *counts* in the same declaration.

COUN'TER-APPROACH'ES (*contre*: *Fr.*; from *contra*, against: *Lat.*), in Fortification, lines and trenches made by the besieged, in order to attack the works of the besiegers, or to hinder their approaches.

COUN'TERDRAWING, in Painting, copying a design or painting by means of lines drawn on oiled paper or other transparent substance.

COUN'TERGUARD, in Fortification, a small rampart or work raised before the point of a bastion, consisting of two long faces parallel to the faces of the bastion, making a salient angle to preserve the bastion.

COUN'TERMARK, a mark put upon goods that have been marked before. It is also used for the several marks put upon goods belonging to several persons, to show that they must not be opened but in the presence of all the owners, or their agents. —— In Numismatics, a stamp frequently seen on ancient coins, often obliterating a large part of the impression. Some consider it intended to augment the value; others, to signify it was taken from an enemy.——The mark of the Goldsmiths' Company, affixed to an article of gold or silver plate after assay, to show the metal to be of a certain fineness.

COUN'TERMINE, in Military affairs, a well and gallery sunk in the earth, and running underground: it is intended to prevent the effect of the enemy's mine; or, in other words, is a mine made by the besieged, in order to blow up the mine of the besiegers.

COUN'TERPALED, in Heraldry, is when the escutcheon is divided into twelve pales parted *per fesse:* the two colours are counterchanged, so that the upper and lower are of different colours.

COUN'TERPART, the corresponding part or duplicate. Also the part which fits another: as, the key of a cipher.——In Law, when the parts of an indenture are interchangeably executed by the several parties, that executed by the grantors is termed the *original*, and the rest are *counterparts*. If each part is signed by all parties, they are *duplicate originals*. A deed made by one party is not indented, but *polled*, or shaved quite even: and is, therefore, styled a *deed poll*, or single deed.——In Music, the part to be applied to another; thus, the bass is the counterpart to the treble.

COUNTERPAS'SANT, in Heraldry, is when two lions in a coat of arms are represented as going contrary ways.

COUN'TERPOINT, in Music, the science of harmony, including the art of combining and modulating consonant sounds, or of disposing several parts in such a manner as to make an agreeable whole.

COUN'TERPROOF, an engraving taken from another fresh printed, which, by being passed through a rolling press, gives an inverted copy of the former.

COUNTER-REVOLU'TION, a revolution opposed to a former one, and restoring a former state of things.

COUN'TERSCARP, in Fortification, that side of the ditch which is next the country; but it often signifies the whole covered way, with its parapet and glacis.

COUNTER-SECU'RITY, security given to one who has entered into a bond, or become surety for another.

COUN'TERSIGN, a military watchword; or a private signal given to soldiers on guard, with orders to let no one pass unless he first gives that word.——Also, to sign, as secretary, or other subordinate officer, any writing signed by a principal or superior, to attest the authenticity of his signature.

COUNTER-TEN'OR, in Music, one of the middle parts, between the treble and the tenor.

COUN'TY (*comté*, the territory of a count: *Fr.*), originally the district or territory of a count or earl: one of the ancient divisions of England, which, by the Saxons, were called *shires*, a term not applied to such counties as were anciently kingdoms, such as Kent, Essex, &c. England is divided into forty counties or shires, Wales into twelve, Scotland into thirty-three, and Ireland into thirty-two. Each county has its sheriff and its court, with other officers, employed in the administration of justice and the execution of the laws. The lord-lieutenant of a county has the command of its militia.——COUNTY CORPORATE, a title given to several cities, or ancient boroughs, on which certain kings of England have bestowed peculiar privileges; annexing territory, land, or jurisdiction, and making them counties within themselves, with their own sheriffs and other officers; but all causes of action arising, and offences committed, in a county corporate, may be tried in the next adjoining county at large.——COUNTY PALATINE, a county distinguished by particular privileges, and named from *palatium*, the palace, because the owner had originally royal powers in the administration of justice. The counties palatine in England are Lancaster, Chester, and Durham.

COUP (a blow: *Fr.*), a term used in several expressions. Thus, COUP DE GRACE, the finishing blow.——COUP DE MAIN, a sudden unpremeditated attack.——COUP D'ŒIL, the first glance of the eye, with which it surveys any object.——COUP DE SOLEIL, a disorder produced by the action of a hot sun.

COUPE'D or **COUPE'** (*coupé*, cut: *Fr.*), in Heraldry, is used to express the head or any limb of an animal, cut off smooth from the trunk: distinguishing it from that which is called *erased*, or forcibly torn off.——COUPED is also used to signify such crosses, bends, bars, chevrons, &c., as do not touch the sides of the escutcheon, but are, as it were, cut off from them.

COUP'LE-CLOSE, in Heraldry, an ordinary, so termed from its enclosing the chevron by couples, being always borne in pairs, one on each side a chevron.

COUP'LET, the division of a poem, containing two verses or two rhymes.

COU'RANT (running: *Fr.*), in Heraldry, an epithet for any beast represented in a running attitude.

COURAN'TO (*corrente*, running: *Ital.*), a piece of music in triple time: also a kind of dance.

COURSE (*Fr.*), in its general sense, a motion forward, either in a direct or curving line. Applied to the arts and sciences, it denotes a methodical series.——COURSE, in Navigation, that point of the compass on which a ship steers.——COURSE, in Masonry, a continued range of bricks or stones of the same height.——COURSE OF EXCHANGE, in Commerce, is the current price or rate at which the coin of one country is exchanged for that of another; which, as it depends upon the balance of trade and the political relations which subsist between the two countries, is always fluctuating.——COURSES, in a ship, the large square sails.

COURS'ING, the act or sport of pursuing any beast of chase, as the hare, &c., with greyhounds.

COURT-BAR'ON was a court incident to every manor. There was one, also, in every hundred and county. It has long fallen into disuse, except in manors of ancient demesne, the lord of which was once the king, and manors containing land of copyhold or customary tenure.

COURT-LEET' (*leod*, the common people: *Sax.*), a court of record held once a year, in a particular hundred, lordship, or manor, before the steward of the leet. The business of the court-leet is now done at quarter sessions, except in certain manors, where it has been held from time immemorial.

COURT-MAR'TIAL, a court consisting of military officers, for the trial of the military offences of officers and soldiers.——A NAVAL COURT-MARTIAL is a similar court for those constituting the navy.

COURT'-ROLL, a roll containing an account of the number, &c., of lands which depend on the jurisdiction of the manor, &c.

COUR'TESY, TENURE BY (*courtoisie: Fr.*), in Law, is where a man marries a woman seised of an estate of inheritance, and has by her issue born alive, which was capable of inheriting her estate: in this case, on the death of his wife, he holds the lands for his life, as tenant by courtesy.

COUR'TESY TITLES. The children of noblemen in this country have no right by law to any title whatever, but courtesy has allowed them to assume rank according to the rank of their parents. Thus the eldest son of a duke bears a marquisate by courtesy, the eldest son of a marquis an earldom by courtesy, whilst the younger sons and daughters of both bear the title of lord and lady prefixed to their Christian and surnames. The eldest son of an earl has a viscounty by courtesy, the younger sons are styled honourable, and the daughters lady. All the sons and daughters of viscounts and barons are styled honourable. Although in the ordinary intercourse of society the titles above designated are accorded, in all legal documents the gentlemen are styled esquires, with a reference to the courtesy title: thus, John Brown, Esquire, commonly called Marquis of W.; or James Taylor, Esquire, commonly called Lord James Taylor. The courtesy titles of eldest sons are usually those of the second title of the father. It may, however, happen, that a duke has no marquisate, but only an earldom, in which case the eldest son takes that title, and yet ranks just the same as if he had assumed a marquisate. And so on with respect to lower grades of the peerage. When the daughters of peers marry a man of rank inferior to their own, they by courtesy retain their titles; but if a woman who has no title marries a man who has merely a courtesy title, and is left a widow, she loses the title she had assumed during her husband's life, in case she marries again. This, however, is not the case with respect to the widow of a man who has a title in his own right. If she marries again, she by courtesy retains her title.

COV'ENANT (*convenio*, I agree with: *Lat.*), in Law, an engagement, in writing, under seal, to do or omit a direct act. There are many kinds of covenant.

COW'ITCH, or **COW'AGE**, an Indian plant, the *Mucuna pruricus* of botanists, nat. ord. *Leguminosæ*, the pods of which are covered with microscopic hairs, that are employed as a mechanical anthelmintic. They are very troublesome if accidentally brought into contact with the skin.

COW'POX, the vaccine disease, produced by transferring morbific matter from the udder of a cow to the human body. It was proposed by Dr. Jenner, in 1798, as a substitute for and preventative of small-pox. Small bluish vesicles, surrounded by inflammation, elevated at the edge, and depressed at the centre, and containing a limpid fluid, occasionally appear on the teats of the cow, the animal being, at the same time, somewhat indisposed. This disease, transferred to the hands of the milkers, was found, in many cases, to preserve from small-pox. A disease of the horse's head, called *grease*, communicated to the hands of farriers, seems to have produced the same effect. The matter from the cow is, however, the most certain; and that which it produces in one human subject may be successfully transferred to another; though it is probable that it loses its efficacy by being transmitted too many times. In doubtful cases, the vaccination should be repeated; its repetition, even though unnecessary, can be attended with little inconvenience.

COW'RIE, or **KAW'RIE PINE**, a lofty coniferous tree, a native of New Zealand, named by botanists *Dammara australis*. It yields a hard brittle resin, like copal, and its timber is excellent.

COWRY, the popular name of several species of marine univalve shells, belonging to the genus *Cypræa*. One species, the *C. moneta*, or money-cowry, is used in place of coin on the west coast of Africa, and many tons weight are annually imported into this country from the Pacific and eastern seas, for the purpose of being sent to Africa. There are many species of this genus, some of which are beautifully marked and coloured. Savages, in various parts, adorn their persons or indicate their rank with cowries.

COW TREE, a name applied to distinct species of trees growing in tropical countries, on account of their yielding a milk-like innoxious fluid. One of these, the Massaranduba, found on the Amazons, grows to the dimensions of a forest tree. Milk can be drawn from its logs after they have been allowed to stand for many days in the hot sun. 'The timber (says Mr. A. R. Wallace) is very hard, fine grained, and durable, and is valuable for works which are much exposed to the weather. The fruit is eatable, and very good, the size of a small apple, and full of a rich and juicy pulp. The milk, which exudes in abundance when the bark is cut, has the consistence of thick cream, and, but for a very slight peculiar taste, could scarcely be distinguished from the genuine product of the cow. It is also used for glue, and is said to be as durable as that made use of by carpenters. As the milk hardens by exposure to the air, it becomes a very tough, slightly elastic, substance, much resembling gutta percha.'

CRAB (*crabba: Sax.*), the popular name for the species of a considerable group of invertebrate animals, whose bodies are covered by a calcareous crust, with ten articulated limbs. They belong to the *Decapoda brachyura*, or ten-legged short-tailed crustacea; and include a great number of species, differing in size, colour, and habits. The large and small edible crabs of our coasts may be taken as examples. Their sight is very acute, and their masticatory apparatus is exceedingly complicated. Some of them are exclusively aquatic, and remain on the sands or rocks, at great depths in the sea; others inhabit excavations formed in the soft coral reefs or bars on certain coasts; some spend their life altogether on shore, in burrows or dens; others live on rocky beaches, basking in the sun, and only retiring into the sea when alarmed; while some species are completely terrestrial, inhabiting holes upon the highest hills and mountains of the West Indies. The most remarkable are the crabs which are found in the less densely peopled or uninhabited West Indian islands. When the season for spawning arrives, they proceed to the sea in a body of many millions, a journey which employs them some weeks. Having deposited their eggs in the sand, they return, travelling only by night, and arrive emaciated and exhausted.

CRACKLE CHI'NA is a ware much prized by collectors, the surface of which is everywhere marked by cracks which give the vessel the appearance of being composed of small pieces cemented together.

CRAMP (*krampe: Ger.*), a convulsive contraction of a muscular part of the body, with pain.

CRAN'BERRY, the fruit of the *Oxycoccus palustris*, nat. ord. *Vacciniaceæ*, a creeping plant, growing only on peat bogs or swampy land, and bearing small bright red berries, which have a pleasant acid flavour, and are much used in tarts.

CRANE (*cran: Sax.*), a migratory bird of the family *Gruidæ*, which is an occasional visitor to England. It is the *Grus cinerea* of naturalists, and it soars high in the air, and performs journeys of immense extent; has blackish or black wing-feathers, with an ash-coloured body. The *Grus gigantea*, or Siberian crane, is of great size, being four feet six inches in height: the male and female watch the nest alternately during incubation.——**CRANE**, a machine for raising great weights, consisting of an arm, or piece of timber, projecting from a post, either horizontally or at some angle, and furnished with a pulley. It is also made of iron, on the principle of the wheel and pinion; by which it is rendered very commodious, and capable of raising immense weights.

CRA'NE-LINES, in a ship, are lines going from the upper end of the spritsail-topmast to the middle of the forestays. They serve to keep the spritsail-topmast upright and steady in its place, and to strengthen it.

CRA'NE'S-BILL, the popular name of the wild species of the genus *Geranium*, these plants having their seed vessel in the shape of a crane's beak.

CRANIOL'OGY (*kranion*, the skull; and *logos*, a discourse: *Gr.*), that branch of science which is concerned with the structure and uses of the skull in various animals, particularly in relation to their characters and intellectual powers. One who is versed in this science is termed a *craniologist*.

CRANIOM'ETER (*kranion*, the skull; and *metron*, a measure: *Gr.*), an instrument for measuring the skulls of animals. The art of measuring them, for the purpose of discovering their specific differences, is called *craniometry*.

CRANIOS'COPY (*kranion*, the skull; and *skopeo*, I examine: *Gr.*), the science of discovering, by the eminences produced by the brain on the cranium, the particular parts in which reside the organs that influence certain passions or faculties.

CRA'NIUM (*kranion: Gr.*), the skull; the assemblage of bones which enclose the brain. They consist of the frontal bone forming the forehead; the two parietal bones occupying the sides and roof of the skull; the two temporal bones forming the walls at the temples; and the occipital bone situate at the posterior and inferior part. These bones are joined together by means of interlocking serratures called **SUTURES**. The fore part of the skull is termed the sinciput, the hinder part the occiput, and the top, the vertex. Wedged in between the bones at the base of the skull are the two bones termed ethmoid and sphenoid, which may be considered as common to the cranium and the face. No cranium of an adult man has been found with a less capacity than 62 cubic inches: whilst the contents of the largest gorilla skull hitherto measured did not exceed 84½ cubic inches.

CRANK, a bend in an axle upon which the piston of a steam-engine acts, and thus a back and forward motion is converted into a circular motion. A ship is said to be *crank-sided* when she can bear but little sail, for fear of oversetting: and when a ship cannot be brought on the ground without danger, she is said to be *crank* by the ground.

CRAPE (*crêpe: Fr.*), a light transparent stuff, resembling gauze. It is made of raw silk, gummed and twisted in the mill, and is much used in mourning.

CRA'GIS (*krasis* a mixing *Lat.*), the healthy constitution of the blood in an animal body.

CRASSAMEN'TUM (sediment: *Lat.*), in Physic, the thick red or fibrous part of the blood, as distinguished from the serum, or aqueous part.

CRATCH'ES (*crach*, the itch: *Wel.*), in Farriery, a swelling on the pastern, under the fetlock, and sometimes under the hoof of a horse.

CRA'TER (*kratēr: Gr.*), the cup-shaped hollow of a volcano from which matter is ejected.——In Antiquity, a very large wine-cup, or goblet, out of which the ancients poured their libations at feasts.

CRAY'FISH, or CRAW'FISH (*écrevisse: Fr.*), a freshwater crustacean of the genus *Astacus*, which differs but little in appearance from the lobster. Crayfish are found everywhere, and very abundantly in England. Their flesh is wholesome and nutritious.

CRAY'ON (*Fr.*), a general name for all coloured mineral substances, used in designing or painting in pastil; whether they have been beaten and reduced to a paste, or are used in their primitive consistence, after sawing or cutting them into long narrow slips.

CREAM (*crême: Fr*), the oily part of milk, which rises to the surface, and forms a distinct layer. By agitation the solid butter is separated from the fluid oil.——Cream of Lime, a mixture of lime and water, used in gas-works for purifying the gas, which is transmitted through it; carbonic acid and sulphuretted hydrogen being absorbed by it.——Cream of Tartar, common white tartar freed from its impurities: the crystallized bitartrate of potash.

CREDEN'DA (*Lat.*), in Theology, things to be believed; articles of faith: distinguished from *agenda*, or practical duties.

CREDEN'TIAL LET'TERS (*credo*, I have confidence in: *Lat.*), the instrument, in the form of a letter, from one monarch to another, which constitutes the evidence of the title of a minister at a foreign court to the power which he exercises.

CRE'DIT (same *deriv.*), in Political Economy, the lending of money, or what is equivalent to it. He who lends *gives* credit, and he who borrows *obtains* it. A person who buys goods which are to be paid for at a future time, or who discounts a bill, obtains the command of so much capital belonging to another. There is no creation of wealth by these transactions.——Credit, in Bookkeeping, the side of an account in which payment is entered, opposed to *debit*.——Public Credit, the trust or confidence placed in a state by those who lend money to it.——Letters of Credit, letters given by merchants to persons who are to draw money from their correspondents.

CREED (*credo*, I believe: *Lat.*), a summary of belief; the principal articles of religious faith.

CREEK (*crecca: Sax.*), that part of a haven, or small channel, running from the sea, where goods are landed. In North America the tributaries to a river are called creeks.

CREMO'NA, an appellation for the superior sort of violins, which were made at Cremona, in Italy, during the 17th and 18th centuries, by the family of the *Amati*. Also a name erroneously given to a reed stop of the organ, originally intended to imitate the *krumhorn*, an ancient wind instrument.

CRE'NATE (*créneler*, to indent: *Fr.*), in Botany, an epithet for leaves, the edges of which are furnished with small rounded projections or teeth, inclining towards neither the point nor the base. When the edge of a leaf is cut into very minute notches, the word *crenulate* is used.

CRE'OLE, an epithet given in Spanish America to the American born children of European parents.

CRE'OSOTE or KRE'OSOTE (*kreas*, flesh; and *sozo*, I preserve: *Gr.*), one of the substances obtained by the distillation of tar. It is a colourless, oily liquid, of high refractive and dispersive power, with a penetrating odour. It is slightly heavier than water. It is a compound of carbon, oxygen, and hydrogen. It possesses great antiseptic power; a piece of meat steeped in it will never putrefy. It is used as a preservative for timber which has to be placed in the ground.

CREPITA'TION (*crepito*, I crackle: *Lat.*), the crackling noise made by some salts during the process of calcination.

CREPUS'CULUM, or CREPUS'CLE (*crepusculum*, a *dim.* of *creper*, dusky: *Lat.*), the twilight, which begins in the morning when the sun has arrived within 18° of the horizon, and ends in the evening when the sun is 18° below the horizon. It is due to the refraction of the sun's rays by the atmosphere.

CRESCEN'DO (*Ital.*), a term in Music, used to show that there is to be a gradual swelling of the notes over which it is placed.

CRES'CENT (*cresco*, I increase: *Lat.*), the increasing or new moon, which shows a curving rim of light, terminating in points or horns.——The Turkish standard, on which a crescent is depicted; and, figuratively, the Turkish power, or empire of the crescent. This emblem was used to indicate sovereignty, even in the time of the early Roman emperors, and continued to be employed by the Greek emperors. The Turks adopted it because, meeting it wherever they turned, they considered it a good omen.——In Heraldry, it is an honourable ordinary, often used as a mark of distinction for the second sons of families, or those descended from them. When the horns are turned towards the *chief*, or upper part of the shield, it is called *crescent;* when to the right, *increscent;* and when to the left, *decrescent*.

CRESCEN'TIA, in Botany, a genus of tropical trees belonging to the nat. ord. *Crescentiaceæ*. The *Crescentia cujete*, a tree inhabiting tropical America, bears a large gourd-like fruit called Calabash, the pulp of which is eaten, and the hard shell employed in place of bottles.

CRESS (*kresse: Germ.*), the name of several species of plants, of which the most useful are water-cress (*Nasturtium offici-*

nale), and common cress (*Lepidium sativum*), both belonging to the nat. ord. *Cruciferæ*.

CREST (*crista: Lat.*), the plume of feathers, or other object, on the top of the ancient helmet. The crest is considered a greater criterion of nobility than the armour generally, and therefore forms an important subject in heraldry.

CRE'TA (chalk: *Lat.*), in Pharmacy, the name of chalk, carbonate of lime.

CRETA'CEOUS (*cretaceus*, like chalk: *Lat.*), partaking of the qualities of, or abounding in chalk.——In Geology, a group of secondary strata, divided into Upper and Lower, or Neocomian. The former is again divided into the Maestricht beds, which are wanting in England; the Upper White Chalk, which contains layers of flint, and is exemplified in the North and South Downs; the Lower White Chalk, the Upper Green Sand, and the Gault. The Neocomian division embraces the Lower Green Sand and the Wealden series.

CRE'TINISM (*crétinisme: Fr.*), a peculiar endemic disease, common in some parts of Switzerland, and in some other mountain districts. It makes a close approach to rickets in its general symptoms, but is distinguished by the tendency to that peculiar enlargement of the thyroid gland, called by the French goitre, and by us Derbyshire-neck, and by the mental imbecility which accompanies it. The individuals affected with this disease are called *crétins*.

CREUX (a hollow: *Fr.*), a term used in Sculpture, where the lines and figures are cut below the surface of the substances engraved; thus it stands opposed to *rilievo*, implying the prominence of the lines and figures, which appear above the surface.

CRE'VASSE (*Fr.*), a deep cleft in a glacier. When covered over with snow it is very dangerous to travellers on the ice, who, to prevent mishap, usually proceed in single file, and tie themselves together by a rope passed round the waist of each.

CRIB'RIFORM (*cribrum*, a sieve; and *forma*, a form: *Lat.*), in Anatomy, a term applied to the laminæ of the ethmoid bone, through which the fibres of the olfactory nerve pass to the nose.

CRIBRO'SUM OS (the bone having the appearance of a sieve: *Lat.*), called also *os ethmoides*, in Anatomy, a bone situated internally in the fore part of the basis of the skull.

CRICK'ET (*cryce*, a stick: *Sax.*), an active, manly game, which is played with bats and a ball, and is almost peculiar to this country. The number of the party on each side is eleven, who alternately take the innings, and alternately the bowling and fielding. ——CRICKET, the popular name of some saltatorial orthopterous insects, which are divided by naturalists amongst different genera, and placed in the neighbourhood of the locusts and grasshoppers. The chirp of the house-cricket (*Acheta domestica*), and the field cricket (*A. campestris*), is made by rubbing one of the wing-cases over the other. The mole-cricket (*Gryllotalpa vulgaris*) has very strong fore-legs, with which it burrows in the ground.

CRICOI'DES (*krikos*, a ring; and *eidos*, form: *Gr.*), in Anatomy, a cartilage of the larynx, called also the *annular cartilage*.

CRIME (*crimen: Lat.*). In the general sense of the word, crimes are understood to be offences against society or morals, as far as they are amenable to the laws. To this we may add, in order more clearly to distinguish between words often considered synonymous, that actions contrary to the precepts of religion are called *sins*; actions contrary to the principles of morality are called *vices*; and actions contrary to the laws of the state are called *crimes*.

CRIN'GLE, or **CRIN'KLE** (*krinkelen*, to run in flexures: *Dut.*), in Marine language, a hole in the bolt-rope of a sail, to receive the ends of the ropes by which the sail is drawn up to its yard, or to extend the leech by the bowline bridles. *Iron cringles*, or *hanks*, are open rings running on the stays, to which the heads of the staysails are made fast.

CRI'SIS (*Gr.*, from *krino*, I judge), in Medicine, is a sudden change, either for the better or the worse, indicative of recovery or death. In its more general sense, it denotes that stage of a disorder at which some judgment may be formed of its termination. At the approach of a crisis, the disease appears to assume a more violent character. If the change is for the better, the violent symptoms cease with a copious perspiration, or some other discharge from the system. After a salutary crisis, the patient feels himself relieved, and the dangerous symptoms cease.——By a CRISIS is also meant the point of time when an affair is arrived at its height, and must soon terminate or suffer a material change.

CRISP (*crispus*, curled: *Lat.*), in Botany, an epithet for a leaf folded over and over at the edges, which are always serrated, dentated, or lacerated.

CRIS'TATE or **CRIS'TATED** (*cristatus*, tufted: *Lat.*), a botanical epithet for having an appendage like a tuft or crest; as applied to some anthers and flowers.

CRITE'RION (*kritērion*, from *kritēs*, a decider: *Gr.*), a standard measure or test.

CRIT'IC (*kritēs*, a judge: *Gr.*), a person who, with the requisite ability, estimates the value of works of art, whether of literature or in the Fine Arts, and points out their merits and faults, with reference to established principles.

CRO'CEOUS (*krokeos*, from *krokos*, saffron: *Gr.*), resembling saffron.

CROC'ODILE (*krokodeilos: Gr.*), the popular name of some hideous fourfooted reptiles, belonging to the genus *Crocodilus*, which are distinguished from the alligators by having webbed feet. The common crocodile (*C. vulgaris*) has the sides and body covered with bony armour, which, on the upper part of the body, is strong enough to resist a musket-ball. It sometimes grows to the length of twenty feet. It inhabits the large rivers in Africa, and lays its eggs in the sand to be hatched by the sun.

CRO'CUS (*krokos*, saffron: *Gr.*), in Chemistry, an old term, signifying a metal calcined to a red or deep yellow colour.——In Botany, a genus of plants with pretty flowers, belonging to the nat. ord. *Iridaceæ*.

CROIS'ES (crusaders: *Fr.*), in English Antiquity, pilgrims bound for the Holy Land, or such as had been there; so called from a badge they wore in imitation of a cross. The knights of St. John of Jerusalem, created for the defence and protection of pilgrims, were particularly called *croises;* and so were all those of the English nobility and gentry, who, in the reigns of Henry II., Richard I., Henry III., and Edward I., were *cruce signati*, that is, devoted to the recovery of Palestine.

CROM'LECH (*crwmlech: Wel.;* from *carem luach*, a devoted stone: *Heb.*), in British Antiquity, large broad flat stones raised upon other stones set up to support them. They are common in Wales, Devonshire, and Cornwall, and are thought to be remains of altars.

CROSS, in Antiquity, an instrument of torture, consisting of two pieces of timber crossing each other, one part being vertical and the other horizontal, or both oblique. This punishment was only inflicted on malefactors and slaves, and was thence called *servile supplicium*. The most usual method was to nail the criminal's hands and feet to this gibbet, in an erect posture; though there are instances of criminals so nailed with their head downward.——CROSS, the symbol of the Christian religion; and hence, figuratively, the religion itself.——Also, a monument with a cross upon it, to excite devotion, such as were anciently set up in market-places.——In Theology, the doctrine of Christ's sufferings, and of the atonement.——A Latin cross has one arm longer than the others; a Greek cross has equal arms.——CROSS, in Heraldry, an ordinary formed by lines drawn palewise and fessewise; and, if bounded by the escutcheon, enclosing one-fifth of the shield, or one-third if charged. A cross gules, one bar being vertical, the other horizontal, is called the *cross of St. George*. The *cross of St. Andrew* has both bars oblique. The extremities of a plain cross are 'couped,' that is, do not reach the circumference of the escutcheon. There are other crosses also which do not reach the circumference: thus, a *cross crosslet*, termed a Jerusalem cross when between four plain crosses: it is crossed on each arm. A *cross fleury* has three points at each end. A *Maltese cross* has arms increasing in breadth towards the ends, which terminate with double points. A *cross fitchy* has the lower limb pointed. A *patriarchal cross* is plain, and has two horizontal bars, the upper shorter. A *cross moline* terminates in representations of the millrind: it is the difference of the eighth son of a family.

CROSS-BAR-SHOT, a bullet with an iron bar passing through it, and standing out a few inches on each side; used in naval actions for cutting the enemy's rigging.

CROSS'-BILL, the common name of birds allied to the finches, and belonging to the genus *Loxia*. They are distinguished by having the mandibles crossing each other at the point. Buffon called this curious structure an error and defect of nature, and a useless deformity, but it has been found to enable them easily to obtain their usual food, the seeds of pine trees. The common cross-bill rarely breeds in England.

CROSS'-BOW, a missive weapon formerly much used, which was strung and set in a shaft of wood, with a trigger, &c.

CROSS'-EXAMINATION, in Law, a close and rigid examination of a witness by the counsel of the adverse party, after he has been examined in chief by the counsel of the party producing him.

CROSS'-STAFF, an instrument to take the altitude of the sun or stars.

CROSS'-STONE, a mineral of a greyish-white colour, called also *harmostone*, occurring in double and single crystals.

CROSS'-TREES, pieces of timber in a ship, supported by the cheeks and trestle-trees, at the upper ends of the lower masts, to sustain what is above, and to extend the top-gallant shrouds.

CROSS'LET (*croisette: Fr.*), in Heraldry, a little or diminutive cross: the shield is frequently seen covered with crosslets. Also, fesses, and other honourable ordinaries, are charged or accompanied with crosslets.

CROT'CHET (*crochet: Fr.*), in Music, half a minim.——In Printing, this mark [ ], to separate what is not a necessary part of the sentence.

CRO'TON OIL, one of the most valuable of the late additions to the materia medica, is expressed from the seeds of the *Croton tiglium*, an East Indian plant, belonging to the nat. ord. *Euphorbiaceæ*. It is so strongly purgative, that one drop is a full dose, and half a drop will sometimes produce a powerful effect.

CROUP (*Fr.*), in Medicine, the disease called *Cynanche trachealis*, an affection of the throat, accompanied by a peculiar shrillness of voice, wheezing, difficult respiration, &c. It most usually attacks young children, who are suddenly seized with a difficulty of breathing and other symptoms. Exposure to cold seems to be the general cause of the disease, and it is consequently more prevalent in winter and spring than in summer.

CROUPA'DE, in the Manège, a leap in which the horse pulls up his hind legs, as if he drew them up to his belly.

CROUT, KROUT, or SOUR-CROUT (*sauer*, sour; and *kraut*, an herb: *Germ.*), cabbage chopped fine and pickled. It is made by placing chopped cabbage in layers in a barrel, with salt and carraway seeds sprinkled between the layers; then pressing it down, and suffering it to remain till it has undergone fermentation. It is considered an efficacious preservative from the scurvy, and is used at sea, particularly in the Russian navy.

CROW (*craye: Sax.*), or Carrion Crow, the *Corvus corone* of naturalists, a well-known bird belonging to the *Corvidæ*. It is a carrion feeder, and is distinguished from the raven by its beak, voice, and habits, and from the rook by having the basal third of its beak covered with feathers. The Hooded Crow (*C. cornix*) has the plumage of the back and under-surface of the body coloured grey.

CROW'-BAR, in Mechanics, an iron lever, with a claw at one end, and a sharp point at the other; used for raising and moving weights.

CROW'-FOOT, a complication of small cords, spreading out from a long block; used on board ships for suspending the awnings, or keeping the topsails from striking against the tops.

CROW'S'-BILL, in Surgery, a kind of forceps for extracting bullets and other things from wounds.

CROW'S'-FEET, or CALTROPS, in the art of War, an iron instrument with four points, which was formerly thrown upon breaches, or in passes where the enemy's cavalry were expected, for the purpose of injuring the feet of the horses, and throwing them down.

CROWN (*krone: Germ.*), an ornamental badge of regal power, worn on the head by sovereign princes. Among the various crowns and wreaths peculiar to the Greeks and Romans were the following:—The *Corona aurea*, a golden crown, the reward of remarkable bravery. *Corona vallaris*, or *castrensis*, given to him who first entered the camp of an enemy. *Corona civica*, a garland of oak-leaves, one of the highest military rewards: it was given to him who saved the life of a citizen. *Corona convivialis*, the wreath worn at feasts. *Corona muralis*, given by the general to the soldier who first scaled the enemy's wall. *Corona navalis*, given to him who first boarded an enemy's vessel: it was next in rank to the civic crown. *Corona nuptialis*, a crown or wreath worn by brides. *Corona obsidionalis*, a reward given to him who delivered a besieged town or a blockaded army. It was one of the highest military honours, and very seldom obtained. *Corona triumphalis*, a wreath of laurel which was given by the army to the *imperator*, who wore it on his head at the celebration of his triumph.——The Imperial Crown of Great Britain is kept at the Tower of London, where the public is admitted to see it. The following description of it was written by Professor Tennant:—'It was made by Messrs. Rundell and Bridge, in the year 1838, with jewels taken from old crowns, and others. It consists of diamonds, pearls, rubies, sapphires, and emeralds, set in silver and gold; it has a crimson velvet cap, with ermine border, and is lined with white silk. Its gross weight is 39 oz. 5 dwts. troy. The lower part of the band, above the ermine border, consists of a row of 129 pearls, and the upper part of the band of a row of 112 pearls, between which, in front of the crown, is a large sapphire (partly drilled), purchased for the crown by George IV. At the back is a sapphire of smaller size, and six other sapphires (three on each side), between which are eight diamonds. Above and below the seven sapphires are fourteen diamonds, and around the eight emeralds, 128 diamonds. Between the emeralds and sapphires are sixteen trefoil ornaments, containing 160 diamonds. Above the band are eight sapphires, surmounted by eight diamonds, between which are eight festoons, consisting of 148 diamonds. In front of the crown, and in the centre of a diamond Maltese cross, is the famous ruby, said to have been given to Edward, Prince of Wales, son of Edward III., called the Black Prince, by Don Pedro, king of Castile, after the battle of Najera, near Vittoria, A.D. 1367. This ruby was worn in the helmet of Henry V., at the battle of Agincourt, A.D. 1415. It is pierced quite through, after the eastern custom, the upper part of the piercing being filled up by a small ruby. Around this ruby, to form the cross, are 75 brilliant diamonds. Three other Maltese crosses, forming the two sides and back of the crown, have emerald centres, and contain respectively 132, 124, and 130 brilliant diamonds. Between the four Maltese crosses are four ornaments in the form of a French fleur-de-lis, with four rubies in the centres, and surrounded by rose diamonds, containing respectively 85, 86, 86, and 87 rose diamonds. From the Maltese crosses issue four Imperial arches, composed of oak-leaves and acorns, the leaves containing 728 rose, table, and brilliant diamonds, 32 pearls forming the acorns, set in cups containing 54 rose diamonds and one table diamond. The total number of diamonds in the arches and acorns is 108 brilliants, 116 table, and 559 rose diamonds. From the upper part of the arches are suspended four large pendant pear-shaped pearls, with rose diamond caps, containing twelve rose diamonds, and stems containing 24 very small rose diamonds. Above the arch stands the mound, containing in the lower hemisphere 304 brilliants, and in the upper 244 brilliants; the zone and arc being composed of 33 rose diamonds. The cross on the summit has a rose cut sapphire in the centre, surrounded by four large brilliants, and 108 smaller brilliants. Summary of jewels comprised in the crown:—1 large ruby, irregularly polished, 1 large broad-spread sapphire, 16 sapphires, 11 emeralds, 4 rubies, 1,363 brilliant diamonds, 1,273 rose diamonds, 147 table diamonds, 4 drop-shaped pearls, 273 pearls.'——In Architecture, the uppermost member of a cornice.—Among jewellers, the upper work of the rose diamond.——An English silver coin of the value of five shillings.

CROWN'-GLASS. [See GLASS.]

CROWN-IMPE'RIAL, the popular name of some species of *Fritillaria*, nat. ord. *Liliaceæ*.

CROWN-IMPERIAL-SHELL, a beautiful species of *Voluta*, the head of which is surrounded with a series of sharp-pointed tubercles, so as to resemble an open crown: it has also two broad and very beautiful zones running round it.

CROWN'-OFFICE, an office belonging to the court of Queen's Bench, in which the attorney-general exhibits informations for crimes and misdemeanors.

CROWN'-POST, in Building, a post which stands upright in the middle between two principal rafters.

CROWN'-WHEEL, in common watches, the wheel which drives the escapement wheel, or that which acts on the pallets. [See WHEEL.]

CROWN'-WORK, in Fortification, an outwork running into the field, consisting of two demi-bastions at the extremes, and an entire bastion in the middle, with curtains. It is designed to gain some advantageous post, and cover the other works.

CRU'CIAL (*crux*, a cross: *Lat.*), in Surgery, an epithet for transverse, or in the form of a cross; as, a *crucial* incision. *Crucial instances*, a phrase of Bacon, signifying phenomena brought forward to decide between two apparent causes. Chemical tests are generally crucial instances or experiments. 'A well-chosen and strongly-marked crucial instance,' says Sir John Herschel, 'is sometimes of the highest importance, when two theories, which run parallel with each other in their explanation of great classes of phenomena, at length come to be placed at issue on a single fact.'

CRU'CIBLE (*creuset*, from *creuser*, to hollow: *Fr.*), a vessel or melting-pot used in chemical operations, and frequently made of clay, and so tempered and baked as to endure great heat. Silver, platina, and iron crucibles are occasionally used. For melting gold and silver, crucibles are made in great part of plumbago.

CRU'CIFERÆ (*crux*, a cross; and *fero*, I bear: *Lat.*), a large nat. ord. of plants, so named from the four petals which are arranged crosswise. There are six stamens, of which four are longer than the others (upon which character Linnæus founded the class *Tetradynamia*). The fruit is a kind of pod; called a siliqua or silicula, according as it is long and narrow, or broad and short. The shapes of these pods is curiously varied. To this order belong, amongst garden flowers, the stock, wall flower, rocket, honesty, and candy tuft. Here are placed a number of food-plants; cabbage (with its garden varieties, cauliflower, broccoli, and savoys), turnip, mustard, cress, sea-kale, horse-radish, water-cress, and radish.

CRU'CIFORM (*crucis*, of a cross; and *forma*, a form: *Lat.*), an epithet for anything having four arms or rays disposed in the form of a cross.

CRU'DITY (*cruditas*, from *crudus*, raw: *Lat.*), among Physicians, is applied to undigested substances in the stomach, to humours in the body which are imperfectly formed, &c.

CRU'ISER (*croiseur: Fr.*), a small armed vessel that sails to and fro in quest of the enemy, to protect the commerce of its own nation, or for plunder.

CRU'OR (gore: *Lat.*), the *crassamentum*, or clot of the blood which consists of fibrin and red corpuscles.

CRU'RAL (*crus*, the leg: *Lat.*), in Anatomy, an epithet given to the artery which conveys the blood to the legs, and to the vein by which this blood returns towards the heart.

CRUSA'DES (*croisade: Fr.;* from *crux*, a cross: *Lat.*), the name by which the wars or military expeditions were distinguished, that were carried on by the Christian nations of the West, from the end of the eleventh to the end of the thirteenth century, for the conquest of Palestine. They were called crusades, because all the warriors fought under the banner of the *cross*, and wore that emblem on their clothes. The pope considered the invasion of Asia as the means of promoting Christianity amongst the infidels, and of winning whole nations to the bosom of the church; monarchs expected victory and increase of dominion; and their subjects were easily persuaded to engage in the glorious cause! Yet army after army was destroyed; and though some brilliant victories served to exhibit the soldiers of Christendom as heroes of a valorous age, and the holy city of Jerusalem was more than once under their dominion, the Christian empire on the continent of Asia was eventually overthrown, and the dominion of the Mamelukes and Sultans established. But by means of these joint enterprises, the European nations became more connected with each other; feudal tyranny was weakened; a commercial intercourse took place throughout Europe, which greatly augmented the wealth of the cities; the human mind expanded; and a number of arts and sciences, till then unknown by the western nations, were introduced. These advantages were accompanied, undoubtedly, by great evils. There have been six crusades. The first, in 1096, was excited by Peter the hermit, and encouraged by Urban II. It was commanded by Godfrey of Boulogne, and Jerusalem was taken. In the second, which took place in 1142, Conrad III. of Germany, and Louis VII. of France, were leaders, but were unsuccessful. The third, in 1189, was occasioned by the Saracens taking Jerusalem: Frederick II. of Germany, Philip Augustus of France, and Richard Cœur de Lion of England were leaders: the only successful exploit was the taking of Acre. The fourth was conducted by Andrew, king of Hungary, in 1217. The fifth, by Frederick II. of Germany, who for a short time recovered possession of Jerusalem. The sixth was led by St. Louis, king of France, against Egypt, but was unsuccessful.—The wars carried on against the *Albigenses* and others who dissented from the Roman Catholic church, have sometimes been called crusades.

CRUSTA'CEA or **CRUSTA'CEANS** (*crusta*, a shell: *Lat.*), an extensive class of the sub-kingdom *Articulata*, including the crab, lobster, and prawn. The class takes its name from the crust in which the animals are encased; an integument strengthened with carbonate of lime. The body is divided into several segments, to some of which articulated limbs are attached. There are three principal divisions of the body, head, thorax, and abdomen. The thorax is covered by a large shield called the carapace. The abdomen is sometimes small, and soldered to the under side of the thorax; at others it is elongated, and an important agent of locomotion, as in the lobster, when it is furnished with swimming plates at the end. There are usually two pairs of antennæ, one pair being considered by some naturalists the organs of hearing, the other of smell. The great majority of crustaceans are aquatic, some living in freshwater, but the greatest number in the sea, and their blood is aerated by means of gills. All the species lay eggs, which the female usually carries about with her until the time for hatching arrives. They periodically cast their cases as they grow in size, a new case having been prepared beneath the old one, and this is at first a mere soft skin, but it soon becomes as hard as the preceding integument. The forms of these animals are very curiously varied, now one and now another part being transformed or suppressed. They consequently afford very interesting studies to those naturalists who are fond of tracing morphological changes.

CRY'OLITE (*cruos*, frost; *lithos*, a stone: *Gr.*), in Mineralogy, is a substance of a white or yellowish grey colour, occurring in masses of a foliated structure. It is a double fluoride of aluminum and sodium, and there are large deposits of it in Greenland. It is employed as a raw material in the manufacture of aluminate of soda, which is available instead of caustic soda in the saponification of fatty matters. Other useful chemical products are also obtained from the mineral.

CRYOPH'ORUS (*kruos*, frost; and *phero*, I bear: *Gr.*), an instrument invented by Dr. Wollaston for freezing water by its own evaporation.

CRYPT (*kruptê*, a vault—literally a secret place: *Gr.*), a subterranean chapel or oratory, or a vault under a church for the interment of bodies.

CRYPTOG'RAPHY (*krupto*, I conceal; and *graphê*, a writing: *Gr.*), the art of writing in cipher, or secret characters.

CRYPTOL'OGY (*krupto*, I conceal; and *logos*, a discourse: *Gr.*), secret or enigmatical language.

CRYS'TAL (*krustallos*: *Gr.*), in Chemistry and Mineralogy, an inorganic body, which has assumed the form of a regular solid, terminated by a certain number of plane and smooth surfaces. Crystals may be formed in various ways. Some are formed by the evaporation of a fluid holding crystalline substances in solution; or by the passage of a body from the fluid to the solid state, as in the case of most metals; or they may be deposited by the vapour of a volatilized body.——CRYSTAL GLASS, a substance more perfect in its manufacture than common glass. It is frequently cut; and vases, lustres, and other ornaments are made of it.——ICELAND CRYSTAL, a variety of calcareous spar, or crystallized carbonate of lime, brought from Iceland, which is remarkable for its *double refraction.*

CRYS'TALLINE (*krustallinos*, from last: *Gr.*), transparent and pure, resembling crystal.——CRYSTALLINE HEAVENS, in ancient Astronomy, two spheres imagined between the primum mobile and the firmament in the Ptolemaic system.——CRYSTALLINE HUMOUR (of the eye), a colourless transparent, firm substance, adapted like a glass lens, to converge rays of light; it is situated behind the iris, in the vitreous humour of the eye.

CRYS'TALLITE (*krustallos*, a crystal; and *lithos*, a stone: *Gr.*), in Mineralogy, a name given to whinstone, cooled slowly after fusion.

CRYSTALLIZA'TION (*krustallos*, a crystal: *Gr.*), the act or process of forming crystals.

CRYSTALLOG'RAPHY (*krustallos*, a crystal; and *grapho*, I write: *Gr.*), that branch of science which treats of the forms of crystals. The forms assumed by crystallized bodies are very numerous. Of the single substance carbonate of lime some hundreds of forms of crystals have been described and drawn, some of them having more than a hundred facets. A great number of forms, however, are derived from one principal type, and this is one of the polyhedra of geometry, either the cube, the tetrahedron, or the regular octahedron. The tetrahedron is a solid with four faces, forming equilateral triangles, and this is the form assumed by copper pyrites and the diamond The cube has six equal square faces; alum and common salt, and fluor spar afford instances of cubic crystals. The regular octahedron is a solid with eight faces forming equilateral triangles which may be considered as two pyramids placed base to base; alum, copper pyrites, and fluor-spar, exhibit this form. The rhombic dodecahedron is a solid with twelve rhombic faces. It may be regarded as two right hexahedral pyramids. Galena, protoxide of copper, and fluor-spar afford examples of this form. These forms, with their modifications, compose the cubical system. Another system is founded on the Rhomboid, or Rhombohedron, a solid with its faces forming six lozenges, or rhombic figures, each with two acute and two obtuse angles. Nitrate of soda, carbonate of lime, and many other minerals, have crystals of this form. The modifications are infinite, the form passing into the regular hexagon with six sides and six edges, the hexagonal prism with rhombohedral ends, the hexagonal prism with six-sided pyramids at the ends, &c. A third type of crystallization is the right prism with square bases, a solid of equal thickness at the two ends, which are parallel and alike, the four other sides being equal parallelograms. Sulphate of magnesia and sulphate of zinc offer examples of this form, which also is susceptible of numerous modifications, e.g. the end edges may be cut away, but still leaving a square median base (Apophyllite, Mesotype); or a regular octagonal right prism with square bases (Ido crase); or a double octahedral pyramid (oxide of tin), &c. A fourth system is that of the right rectangular prism, a solid with square bases, which are larger than the other sides, and every face parallel and equal to the opposite one. Of this form, Cryolite, Peridote, and Stilbite afford instances. There are, again, a large number of modifications. The fifth type is the right prism, with oblique-angled parallelograms for the bases; Sulphate of Lime, Borate of Soda, and White Felspar affording instances. Without stopping to notice the numerous secondary forms, we pass to the sixth type, an oblique prism with rectangular bases. There are certain irregular forms of crystals which must be briefly noticed. Sometimes, instead of all the angles of a regular solid being truncated, as would be the case in arriving at a regular secondary form, only some are truncated, and these give what are called hemiforms, or defective crystals. Again, two individual crystals are sometimes so united that one is turned a half-revolution with reference to the other. These are termed hemi-trope, or twin crystals. There is another class of crystals named pseudo-morphous, which have been formed by one body filling up a mould made by another belonging to a different type. To measure the angles of crystals, an instrument called a Goniometer is made use of. Crystallography cannot be studied without having models of the principal forms of crystals, and without some knowledge of geometry.

CTENOID (*ktenoeides*, comb-like : *Gr.*), in Ichthyology, a term applied to those fish-scales which are composed of horny or unenamelled bony material with spines at the exposed edge; such as those of the sole, red mullet, and perch.

CU'BATURE (*kubos*, a cube: *Gr.*), in Geometry, the finding exactly the solid or cubic contents of a body.

CUBE (same *deriv.*), in Geometry, a regular solid body, consisting of six square and equal sides, and containing equal angles. The solidity of any cube is found by multiplying the superficial area of one of the sides by the height, or multiplying together three factors, each equal to the common dimension. Thus, the solid contents of a cube, any one of whose surfaces is three feet long, will be 3×3×3, or 27 cubic feet. The product of two of the factors is the *area* of one of its sides. The cube is one of the five regular or Platonic bodies, which, being placed beside each other, fill up the space about a point.——CUBIC NUMBER, in Arithmetic, that which is produced by the multiplication of a square number by its root: thus, 64 is a cube number, and arises by multiplying 16, the square of 4, by the root 4.——CUBE ROOT, the common factor of a cube number: thus, 3 is the cube root of 27.——DOUBLE CUBE; this consists of two cubes placed side by side. Large halls are sometimes built of this shape.

CU'BEBS, the fruit of various species of *Cubeba*, plants belonging to the order of peppers. It is employed in medicine, its virtues depending upon a principle called cubebine, analogous to piperine.

CU'BIC or **CU'BICAL** (*kubikos*, from *kubos*, a cube: *Gr.*), having the form of a cube, or that may be contained within a cube. Thus, a *cubic* foot of water is the water that may be contained within six equal surfaces, each a foot square.

CU'BIT (*cubitus: Lat.*), an ancient measure, equal to the length of a man's arm from the elbow to the tip of the middle finger. Among different nations the length of the cubit differed. The English was 18 inches, the Roman rather less, and the cubit of the Scriptures is supposed to have been 22 inches.

CUBITÆ'US (same *deriv.*), in Anatomy, an epithet for two muscles of the wrist, one of which, called the *externus*, serves to extend the wrist; and the other, the *internus*, to bend it.

CU'BITUS (the elbow : *Lat.*), in Anatomy, the fore arm, reaching from the elbow to the wrist. It is composed of two bones, called *ulna* and *radius*, united by ligaments. The situation of the ulna is interior, its length is greater than that of the radius, and it has a capability of both flexion and extension. The epithet *cubital* is used; as, the *cubital* nerve, artery, or muscle.

CUCK'OO-SPITTLE, a white froth or spume, very common on many plants in the spring, which forms the nidus of the young of the *Aphrophora spumaria*; an insect belonging to the *Cercopidæ* (a family of the homopterous order), and popularly called the Frog-hopper.

CU'CULUS (*Lat.*), in Ornithology, a genus of birds, including our common cuckoo (*Cuculus canorus*), placed in the order of *Scansores*, or climbers. Our cuckoo lays its eggs in the nests of other birds, chiefly in those of the hedge-sparrow, from which the young cuckoos turn out the young sparrows. The cuckoo arrives in Britain about the middle of April, and departs in the first week of July. To this shortness of the period of residence, joined with the numerous progeny which nature has destined it to yield, ornithologists attribute the motive for this singular arrangement in the economy of nature; for by means of it, cuckoo's eggs are laid in an abundance that could not be effected if the bird were to sit herself.

CU'CUMBER (*cucumis: Lat.*). [See CUCURBITACEÆ.]

CUCUR'BIT (*cucurbita*, a gourd : *Lat.*), a chemical vessel shaped somewhat like a gourd. It is used in distillation, and, with its head and cover, constitutes the alembic.

CUCURBITA'CEÆ, a natural order of herbaceous plants, chiefly natives of hot climates, which have unisexual flowers and a climbing habit. An acrid, bitter, purgative principle, abounds in many plants of this order. The only member of it found in Britain is the Wild Bryony (*Bryonia dioica*) of our hedges, which contains a poisonous principle called Bryonine. To this order belong the cucumbers, melons, common gourds and bottle gourds, the bitter apple (*Citrullus*), which yields colocynth, the vegetable marrow, and the chou-chou (*Sechium*), which, in warm countries, bears a fruit that is cooked for the table.

CUD, the food which ruminating animals chew over again; from whence, *to chew the cud* signifies to ponder, think, or ruminate upon a thing.

CUD'DY, in large ships, a place lying between the captain's cabin and the quarter-deck under the poop. It is divided into partitions for the master and other officers. Also, a sort of cabin or cook-room, in the fore-part or near the stern of a lighter or barge of burden.

CUE (*queue*, a tail : *Fr.*), the last words of a speech, which a player, who is to answer, catches and regards as an intimation to begin. Also, a hint given to him of what and when he is to speak.

CUI BONO? A Latin phrase frequently quoted, and usually misapplied. The Roman lawyer Crassus put the question when several persons were suspected of having committed a crime. He asked, 'To whom was it a gain?' since he who would derive a benefit from its commission was more likely to be the guilty person than he who would derive no benefit. He did not ask *what good* has come of the act (as seems to be generally thought from the use made of the quotation at the present time), for, first, the Latin words will not bear such a construction, and, second, Crassus assumed that good had been done to some one, and the enquiry naturally arose, *cui?* to whom?

CUIRASS' (*cuirasse*, from *cuir*, leather: *Fr.*), a piece of defensive armour, made of iron plate, well hardened, and covering the body from the neck to the girdle.——CUIRASSIERS, heavy cavalry armed with a cuirass. In former times cuirasses were very common, but appear to have been disused in England about the reign of Charles II. Napoleon again introduced them; and they have been revived among the European cavalry.

CUL'DEES, in Church History, a religious order, whose origin is attributed to St. Columba, an Irish monk of the 6th century. Being remarkable for the religious exercises of preaching and praying, they were called, by way of eminence, *Cultores Dei*, corrupted to *Culdees*.

CUL DE LAMP, in Architecture, a term used for several decorations in vaults and ceilings.

CU'LEX (a gnat: *Lat.*), in Entomology, a genus of dipterous insects, including the common gnat, *C. ciliaris*.

CULM (*culmus*, a stalk: *Lat.*), in Botany, the stalk or stem of corn or grasses, usually jointed and hollow.—— Also, a provincial term for *anthracite* in various forms.

CULMIF'EROUS (*culmus*, a stalk; and *fero*, I bear: *Lat.*), in Botany, an epithet for such plants as have a smooth jointed stalk, usually hollow, and at each joint wrapped about with single, narrow, sharp-pointed leaves, and seeds contained in chaffy husks; as wheat, rye, barley, &c.

CULMINA'TION (*culmen*, the top of anything: *Lat.*), in Astronomy, the passing of any heavenly body over the meridian, or its greatest altitude for the day. Hence *culmination* is used, metaphorically, for the condition of any person arrived at the most brilliant or important point of his career.

CUL'PRIT (*culpa*, a fault: *Lat.*), in Law, a word applied in court to one who is indicted for a criminal offence.

CUL'VERIN (*coulevrine: Fr.*), a long slender piece of ordnance, serving to carry an 18 lb. ball to a great distance. It was formerly called a hawk.

CUL'VERTAILED (*culvre*, a pigeon: *Sax.*), in Shipbuilding, the fastening one timber into another by a dovetailed joint.

CUM'MIN-SEED (*cuminum: Lat.;* from *kuminon: Gr.*), a long slender seed, of a rough texture, unctuous when bruised, of a strong smell and a pungent taste. It forms an ingredient in curry powder, and is employed in veterinary practice. It is produced by an umbelliferous plant the *Cuminum cyminum* of botanists. Some of the Roman poets allude to its power of producing paleness and languor.

CU'MULUS (a heap: *Lat.*), a large cloud, flat at the base, and rounded in its upper parts.——CIRRO-CUMULUS, small well-defined masses of rounded cloud closely packed with a horizontal arrangement.——CUMULO-STRATUS, a blending of the cirro-stratus with the cumulus.——CUMULO-CIRRO-STRATUS, the raincloud, or *Nimbus*, a horizontal sheet, with the cirrus above, and the cumulus entering it laterally and from below.

CUNE'IFORM (*cuneus*, a wedge; and *forma*, form: *Lat.*), an appellation given to whatever resembles a wedge; as, in Botany, a *cuneiform* leaf. CUNEIFORM LETTERS, those found on old Babylonian and Persian monuments. They are sometimes called arrow-headed characters, and are the simplest and most ancient letters of which we have any knowledge. Specimens of this form of writing are to be seen in the British Museum, on the ancient sculptures of Assyria.

CU'NEUS (*Lat.*), the wedge, in Mechanics.——CUNEUS, in Antiquity, a company of infantry, drawn up in the form of a wedge, the better to break through the enemy's ranks. Also, the seats and benches on which the spectators sat in a theatre, which were narrow next the stage and broad behind.

CUP'BEARER, an officer of the king's household, who was formerly an attendant at a feast.

CU'PEL (because of the shape of a *cup*), a shallow chemical vessel, made generally of bone ash, in which assay-masters try precious metals. When these are changed by fire into a fluid, it absorbs their scoria, the dross formed by the oxidation of their baser constituents.

CU'POLA (*Ital.*), or DOME, in Architecture, a roof or vault, rising in a circular form. [See DOME.]

CUP'PING, in Surgery, the operation of using the *cupping-glass*, a small cup-shaped glass, whence the name. Being applied to some part of the body, the air within it is rarefied; which causes the flesh to protrude into it, on account of the external pressure. On removing the glass, a circular red mark is left, from the propulsion of the blood into the small vessels. This is termed *dry cupping*. It is, however, generally accompanied by a number of incisions produced by an instrument called a *scarificator*. A large quantity of blood may be drawn, by again applying the cupping-glass. When skilfully performed, it is neither a painful nor a dangerous operation.

CU'PREOUS: (*cupreus: Lat.*), resembling copper, or partaking of its qualities.

CUPRES'SUS (the cypress: *Lat.*), in Botany, a genus of coniferous trees, comprehending the various species of CYPRESS, which see.

CUPRIF'EROUS (*cuprum*, copper; and *fero*, I bear: *Lat.*), producing or affording copper; as *cupriferous* silver.

CU'RATE (*curo*, I take care of: *Lat.*), an officiating, but unbeneficed clergyman, who performs the duty of a church, and receives a salary from the incumbent of the living, &c.

CURA'TOR (*Lat.*), in Civil Law, a person regularly appointed to manage the affairs of minors, or persons mad, deaf, dumb, &c. There are also curators for the estate of debtors, and of persons dying without heirs. In learned institutions, the curator takes charge of libraries, collections of natural history, &c.——Among the Romans the title was given to various officers, who were superintendents of different departments of the public service.

CURCULION'IDÆ (*curculio*, a weevil: *Lat.*), in Entomology, a large family of coleopterous insects, including the destructive weevils.

CURCU'MA (*curcum: Arab.*), in Botany, a genus of herbaceous plants, nat. ord., *Zingiberaceæ*, including *Curcuma longa*, the Turmeric plant, and *C. angustifolia*, the East India or arrow root.

CUR'FEW (*couvrir*, to cover: and *feu*, fire: *Fr.*), a law introduced from Normandy into England by William the Conqueror. It ordained that all fire and lights should be extinguished on the ringing of a bell, at eight o'clock, or some other fixed hour of the evening.

CU'RIA (*Lat.*), in Roman Antiquity, a certain division or portion of a tribe. It was the current tradition that Romulus divided the people into thirty *curiæ*, or wards, ten in a tribe; that each might perform the ceremonies of the feast and sacrifices in the temple, or holy place, appointed for the purpose. The priest of the curia was called *curio*. The tribe resembled a Scottish clan, in which the bond of union is supposed to be common blood, though there is no consanguinity between many of the component families.——CURIA, in Law signifies generally a court.

CUR'LEW (*corlieu: Fr.*), a grallatorial bird, which belongs to the *Scolopacidæ*, or snipe family. It lives near waters and marshes, and feeds on worms; and is found in most parts of Europe. The English curlew goes to the sea-side in autumn and winter, and subsists there on marine insects, small crabs, &c.

CUR'RANT (from *Corinth*, in Greece: now *Coranto*), the fruit of well-known shrubs belonging to the genus *Ribes*, nat. ord. *Grossulariaceæ*.——Also, a small kind of dried grape, imported from the Levant.

CUR'RENCY (*curro*, I run: *Lat.*), in Commerce, the coin and bank-notes or other paper-money issued by authority, and which are continually passing current.

CUR'RYING (*corroyer*, to curry: *Fr.*; from *corium*, a skin: *Lat.*), the art of dressing skins after they are tanned, for the purposes of the shoemaker, coach and harness maker, &c., by giving them the necessary smoothness, lustre, colour, and softness. The person working at or carrying on this business is called a *currier*.

CUR'SITOR (*cursito*, I run to and fro: *Lat.*), a clerk belonging to the court of chancery whose business is to make out original writs.

CUR'TAIN (*cortina: Ital.*), in a general sense, a cloth hanging round a bed, or at a window, &c., which may be contracted, spread, or drawn aside at pleasure. Also, a cloth hanging used in theatres, to conceal the stage from the spectators.——CURTAIN, in Fortification, that part of the rampart which is between the flanks of two bastions. It is bordered with a parapet, behind which the soldiers stand to fire on the covered way and into the moat.

CURTA'TION (*curto*, I shorten: *Lat.*), in Astronomy, the interval between a planet's distance from the sun and the curtate distance. The *curtate distance* is the distance of a planet from the sun, reduced to the plane of the ecliptic.

CU'RULE CHAIR (*curulis*, belonging to a chariot: from *currus*, a chariot: *Lat.*), in Roman Antiquity, a chair or stool, adorned with ivory, in which the chief magistrates of Rome had a right to sit. The curule magistrates were the consuls, prætors, curule ædiles, and censors. After the fall of the republic it was assigned to the emperors, and to their statues, in their absence. This chair was often placed in a kind of chariot, whence it had its name.

CUR'VATURE (*curvatura*, a bending: *Lat.*), the peculiar bending or flexure of a line, by which it becomes a curve having certain properties.

CUR'VET (*courbette*, from *courber*, to bend: *Fr.*), in Horsemanship, a particular leap of a horse, when he raises both his fore-legs at once, and, as his fore-legs are falling, both his hind-legs, so that all his feet are off the ground at once.

CUSP (*cuspis*, the point of a spear: *Lat.*), in Astronomy, a term for the horns of the moon.——In Geometry, the point or corner formed by the meeting and termination of two parts of a curve.

CUS'PIDATE or CUS'PIDATED (same *deriv.*), a term in Botany for a leaf, &c., having a sharp end, like the point of a spear.

CUS'TARD-APPLE, the fruit of some species of *Annona*, growing in the West Indies. It is of the size of a tennis-ball, of a green colour, and contains a delicious white pulp of the consistence of custard. One species has the name of sweet sop, another of sour sop.

CUS'TOMARY FREE'HOLD (same *deriv.*), in Law, a superior kind of *copyhold*; the tenant holding, as it is expressed, by copy of court-roll, or roll telling the lands, &c., under the jurisdiction of the manor, &c., by the custom of the manor, but not at the will of the lord.

CUS'TOMS (same *deriv.*), in Political Economy, the duties, toll, tribute, or tariff, payable to the state upon merchandise exported and imported.

CUS'TOS ROTULO'RUM (keeper of the rolls: *Lat.*), the keeper of the rolls and records of a county. He is usually a nobleman, and always a justice of the peace, of the quorum, in the county where he is appointed.——CUSTOS BREVIUM (keeper of the briefs: *Lat.*), the principal clerk belonging to the Common Pleas.——CUSTOS OCULI (keeper of the eye: *Lat.*), in Surgery, an instrument for preserving the eye in some operations.

CUTA'NEOUS (*cutis*, the skin: *Lat.*), an epithet for whatever belongs to or affects the skin: as, a *cutaneous* eruption, &c.

CU'TICLE (*cuticula*, the external skin, a *dim.* of *cutis*, the skin : *Lat.*), in Anatomy, the scarf-skin, a thin membrane closely lying upon the skin or *cutis*, to which it adheres very firmly.

CU'TIS (*Lat.*), in Anatomy, the *derma*, or inner skin, which lies under the cuticle; it is full of pores, nerves, fibres, lymphatic ducts, &c., and is called the *cutis vera*, or true skin, in distinction from the cuticle.

CUT'LAS (*coutelas*, from *couteau*, a knife : *Fr.*), a broad cutting sword, used by seamen in boarding, &c.

CUT'LERY (*coutellerie*, from *couteau*, a knife : *Fr.*), a term applied to all cutting instruments made of steel. Although, in a general sense, it comprises all those articles denominated edge-tools, it is more particularly confined to the manufacture of knives, scissors, razors, surgical instruments, and swords. Those articles which require the edge to possess great tenacity, at the same time that superior hardness is not required, are made from shear steel. The finer kinds of cutlery are made from steel which has been in a state of fusion, and which is termed cast steel, no other being susceptible of a fine polish and very keen edge. Razors are made of cast steel, the edge of a razor requiring the combined advantages of great hardness and tenacity. After the razor blade is formed, it is hardened by gradually raising it to a bright red heat, and plunging it into cold water. It is tempered by heating it afterwards till a brightened part appears of a straw colour. The manufacture of penknives is divided into three departments: — the first is the forging of the blades, the spring, and the iron scales; the second, the grinding and polishing of the blades; and the third, the handling, which consists in fitting up all the parts, and finishing the knife. The blades are made of the best cast steel, and hardened and tempered to about the same degree with that of razors. But the beauty and elegance of polished steel is displayed to great advantage in the manufacture of the finer kinds of scissors. Damascus was anciently famed for its razors, sabres, and swords — the latter especially, which possessed all the advantages of flexibility, elasticity, and hardness: while they presented a beautiful wavy appearance called the water. It is not known how this effect is produced; but it is well imitated in Europe by scooping hollows in the blade and filling them up; also by welding together a bundle of steel bars, cutting and rewelding them, &c. Various other cities and countries have also been famous at different periods for the manufacture of good cutlery: as Sheffield is at the present time, for admirable penknives and surgical instruments.

CUT'TER, a boat attached to a vessel of war, which is rowed with six oars, and is employed in carrying light stores, passengers, &c. Also, a vessel with one mast and a straight running bowsprit, which may be drawn in upon deck. The distinction between a cutter and any other vessel with one mast is, that, in the cutter, the jib has no stay to support it.

CUT'TLE-FISHES (*cutele : Ang. Sax.*), the popular name for certain molluscous animals belonging to the class *Cephalopoda*. There are two sections: 1. Those with eight arms, including the OCTOPUS or Poulpe; 2. those with ten arms, two of which are elongated, including the CALAMARIES or Squids, and the SEPIAS.

CUT'-WATER, the fore part of a ship's prow, which cuts the water.

CY'ANITE (*kuanos*, blue : *Gr.*), in Mineralogy, a ponderous crystallized stone, of a blue or greenish-grey colour. It is a silicate of alumina, with a trace of oxide of iron.

CYAN'OGEN (*kuanos*, blue ; and *gennao*, I produce : *Gr.*), in Chemistry, a bicarburet of nitrogen, a highly poisonous and irrespirable gas. Combined with hydrogen, it forms hydrocyanic or *prussic acid;* and, with the metals, &c., *cyanides*. Prussian blue is a combination of cyanogen and iron.

CYATH'IFORM (*cyathus*, a cup; and *forma*, a form : *Lat.*), in the form of a cup or drinking-glass, a little widened at the top.

CY'ATHUS (*Lat.; from kuathos: Gr.*), in Roman Antiquity, a liquid measure, containing one-twelfth of a *sextarius*, the latter being about equal to our pint.——Also, a cup which the Romans used to fill and drink from as many times as there were letters in the name of their patron or mistress.

CYC'LAMEN (*kuklaminos : Gr.*), in Botany, a genus of plants, nat. ord. *Primulaceæ*. The species have tuberous roots, which in Sicily are said to be eaten by the swine, whence the common name Sow bread. One species is wild in England, *C. europæum.*

CY'CLE (*kuklos*, a circle : *Gr.*), in Chronology, a certain period or series of numbers, which regularly proceed from the first to the last, and then return again to the first, and so circulate perpetually.——CYCLE OF THE SUN, or *solar cycle*, a period of 28 years, in which the same days of the week recur on the same days of the year, and the Sunday or Dominical letter recurs in the same order.——CYCLE OF THE MOON, or *lunar cycle*, a period of 19 years, in which the new and full moon recur on the same days of the month.——CYCLE OF INDICTION, a period of 15 years, in use among the Romans, commencing from the third year before Christ. This cycle has no connection with the celestial motions. It was said to have been instituted by Constantine: but it was used long before that emperor.

CY'CLOGRAPH (*kuklos*, a circle; and *grapho*, I write: *Gr.*), an instrument used for describing the arcs of circles.

CY'CLOID, or TROCHOID (*kuklos*, a circle, or *trochos*, a wheel; and *eidos*, form : *Gr.*), a geometrical curve, generated by a point in the circumference of a circle rolled along a line.——CYCLOIDAL, the space contained between the curve or crooked line and the subtense of the figure.——CYCLOID, a term applied to those fish scales which are composed of concentric layers of horny or bony material, not covered with enamel, and without a spinous edge, such as the scales of the salmon and trout.

CYCLOM'ETRY (*kuklos*, a circle : and

metreo, I measure: *Gr.*), a term sometimes used for the mensuration of circles.

CY'CLONE (*kuklos*, a circle: *Gr.*). This is a storm of great violence and enormous proportions, in which the atmosphere is driven with extraordinary velocity round a central point, which is more or less calm. This point does not, however, remain stationary, but moves onward in obedience to circumstances. The breadth of the wind's path is sometimes 1000 miles. Such storms frequently occur within the tropics (where they are known as typhoons), at the change of the monsoons in August, September, and October, when the NE. trade-wind suddenly veers round, and becomes the SW. monsoon. In the southern hemisphere, the direction of the wind in these storms is like that of the hands of a clock: in the northern hemisphere it moves in the opposite direction. A navigator, overtaken by a cyclone, ought to avail himself of the wind, to avoid the centre, the point of greatest danger, and make towards the edge.

CYCLOPÆ'DIA, or more correctly ENCYCLOPÆ'DIA (*en*, in; *kuklos*, a circle; and *paideia*, instruction: *Gr.*), the circle or compass of the arts and sciences; a common title for a book like the present work.

CYCLOP'IC (*kuklopikos*, relating to *Cyclops*: *Gr.*), savage and gigantic; pertaining to those monsters in fabulous history, who are represented as having assisted Vulcan in forging the thunderbolts of Jove.

CYG'NUS (*Lat.*; from *kuknos*: *Gr.*), in Ornithology, the *Swan*, a well-known water fowl.——CYGNUS, in Astronomy, a constellation of the northern hemisphere. It is in the milky way, and is shaped like a large cross. The principal star is of the second magnitude.

CYL'INDER (*kulindros*, from *kulindo*, I roll: *Gr.*), in Geometry, a solid body, supposed to be generated by the rotation of a parallelogram round one of its sides. This will produce a solid, shaped like a column with parallel sides. If a line from the centre of the upper surface, let fall perpendicularly on the lower, touches the centre of the latter, it is a *right* cylinder; otherwise it is *oblique*. The solid contents of a cylinder, whether right or oblique, is found by multiplying the area of the base by its altitude, and its convex surface is found by multiplying the circumference by the height. The area of the internal diameter of a cylinder, multiplied by its depth, will give the cubical capacity. The solidities of a cone, of a sphere, and of a cylinder formed by the revolution of a square on a line passing through and bisecting it—the circumferences of the bases of the cone and cylinder and the great circle of the sphere being equal—are as 1, 2, and 3. This ratio was first discovered by Archimedes.——CYLINDER, in Gunnery, the whole hollow length of a great gun; the *bore*.

CYLIN'DROID (*kulindros*, a cylinder; and *eidos*, form: *Gr.*), a solid body, approaching to the figure of a cylinder, but differing in some respects, as having the bases elliptical, but parallel and equal.

CY'MA, or CYMA'TIUM (*kuma*, a wave; *kumation*, a small wave: *Gr.*), in Architecture, a member or moulding of the cornice, the profile of which is waving, that is, concave at one part and convex at the other. When the concave part of the moulding projects beyond the convex part, the *cymatium* is denominated a *cyma recta*; but when the convex part forms the greatest projection, it is a *cyma reversa*.

CYM'BAL (*kumbalon*, from *kumbos*, a hollow vessel: *Gr.*), a musical instrument used by the ancients, hollow, and made of brass, supposed to be somewhat like a kettle-drum. The modern *cymbals* used in military bands consist of two concave metal plates, which being held one in each hand are struck together.

CYME (*cyma*: *Lat.*; from *kuma*: *Gr.*), a sprout, a species of inflorescence, in which the flowering stems divide in pairs with a flower springing from the fork.

CYNAN'CHE (*kunanchē*, a bad sore throat; literally, *dog-throttling*: from *kuōn*, a dog; and *ancho*, I strangle: *Gr.*), among Physicians, an inflammation of the larynx It is of several kinds, and comprehends the quinsy, croup, and malignant sore throat.

CYN'IC (*kunikos*, dog-like: *Gr.*), a man of a surly or snarling temper: a misanthrope. —— CYNICS, a sect of ancient philosophers who prided themselves upon their contempt of riches and state, arts, sciences, and amusements. The two most celebrated men of this sect were Antisthenes and Diogenes.

CYN'IPS, in Entomology, a genus of hymenopterous insects, which puncture with their ovipositor the surface of leaves, &c., and deposit with the egg a drop of irritating fluid which produces the different kinds of gall-nuts. The most beautiful gall-nut is the production of the *Cynips Folii-quercûs*, which, piercing the terminal bud of the tree, deposits its egg in the interior, and the juice of the tree exuding and drying round it in concentric portions, converts it from a healthy bud into a fine dark green gall, leafed like a rose-bud beginning to blow, about an inch in diameter, and held to the branch by a pedicle. When the insect is fully formed, it eats through the nut and flies off. The common gall-nut is produced by the *Cynips tinctoria*, upon the *Quercus infectoria*, an oak growing in the Levant. A very curious thing about this genus is, that the male has never yet been discovered, although innumerable nests of gall-flies have been examined.

CYNODON'TES (*kunodon*: from *kuōn*, a dog; and *odous*, a tooth: *Gr.*), in Anatomy, dog-teeth, of which there are two in each jaw, one on each side betwixt the fore-teeth and the grinders.

CYNOREX'IA (*kuōn*, a dog; and *orexis*, an appetite: *Gr.*), in Medicine, a canine appetite.

CYN'OSURE (*kuonosoura*: from *kuōn*, a dog; and *oura*, a tail: *Gr.*), in Astronomy, a name given to *Ursa minor*, or the Lesser Bear, a constellation by which the ancient Phœnicians were guided in their voyages; and hence an object attentively observed, whence the application of the word in our time, 'The cynosure of modern eyes.'——In Greek Mythology, *Cynosura* was the nurse of the infant Jupiter, on Mount Ida in Crete, and was afterwards changed by him into a constellation.

CY'PRESS, the name of several species of coniferous trees, belonging to the genus *Cupressus*. Of the common cypress (*C. sempervirens*) there are two varieties, the horizontal form, and the upright one. The latter is frequently planted in cemeteries in the south of Europe. The *C. lusitanica*, or Cedar of Goa, is an elegant tree, which has been brought from India to Europe. The *C. funebris*, or weeping cypress of the Chinese, is said to be the original of the tree that figures on 'willow pattern' china.

CYPRIN'IDÆ (*kuprinos*, the carp: *Gr.*), in Ichthyology, a family of malacopterous abdominal fishes, with small mouths and no teeth in the jaws, living in fresh water. In England we have several species. The carps and gold fish are placed in the genus *Cyprinus;* the carp, bream, and the white bream in the genus *Abramis;* the roach, dace, chub, rudd, and minnow, in the genus *Leuciscus;* and the barbel, gudgeon, tench, and loach, in the genera *Barbus*, *Gobio*, *Tinca*, and *Cobitis*, respectively.

CYRENA'ICS, a sect of ancient philosophers, so called from their founder Aristippus of Cyrene, a disciple of Socrates. The great principle of their doctrine was, that the supreme good of man in this life is pleasure.

CYST (*kūstis*, a bladder: *Gr.*), a bag which contains morbid matter in animal bodies. ——CYSTIC OXIDE, a peculiar substance supposed to be generated in the kidneys.

CYS'TIDES (same *deriv.*), in Medicine, encysted tumours, or such as have their substance included in a membrane.

CYSTI'TIS (same *deriv.*), in Medicine, inflammation of the bladder.

CYS'TOCELE (*kūstis*, a bladder; and *kēlē*, a hernia: *Gr.*), in Surgery, a hernia or rupture formed by the protrusion of the bladder.

CYSTOT'OMY (*kūstis*, a bladder; and *temno*, I cut: *Gr.*), the practice of opening encysted tumours for the discharge of morbid matter.

CYT'ISUS (*kutisos: Gr.*), a genus of leguminous trees and shrubs, with pea-like flowers, chiefly natives of the south of Europe. Our common laburnum is one of the species.

CYT'OBLASTEMA (*kūstis*, a bladder; and *blastema*, a sprout: *Gr.*), in Physiology, a liquid or semi-fluid substance, consisting of proteine, fatty matter, and salts, found inside cells, or without them. It is also called blastema or protoplasm, and it is supposed to be the formative matter of cells.

CZAR (*Cæsar*), the title assumed by the emperors of Russia. The first that bore the title of czar of Moscow was Ivan II. in 1579. The eldest son of the czar was called *Czarovicz*, or as we usually spell it, *Cesarewitch;* but this appellation was discontinued after the murder of Alexis, the son of Peter I., until revived by Paul I. in 1799, in favour of Constantine, his second son. The consort of the czar is termed *Czarina*.

D

D, the fourth letter in the Hebrew alphabet, and in those derived from it. It is a palato-dental having a kind of middle sound between the *t* and *th;* its sound being formed by a stronger impulse of the tongue against the upper part of the mouth, than is necessary in the pronunciation of the *t*. D, as a numeral, denotes 500; but it is more correct to write IO. As an abbreviation, it stands for *Doctor:* M.D. *Medicinæ Doctor*, Doctor of Medicine. And for *Divinitatis:* D.D. *Divinitatis Doctor*, Doctor of Divinity. For *Domini:* A.D. *Anno Domini*, in the year of our Lord. For *Dei: Dei gratiâ*, by the grace of God. For *Defensor:* F.D. *Fidei defensor*, Defender of the faith, &c.——By Roman writers, it is used for *Divus*, *Decius*, *Devotus*, *Diebus*, *Diis*, &c. Thus D.M., in Roman epitaphs, signified *Diis Manubus* (to the infernal gods); but, on other occasions, *Diis Magnis* (to the great gods).——As a sign, it is one of the Dominical or Sunday letters; and in Music, it is the nominal of the second note in the natural diatonic scale of C.

DAB, a small flat fish, the *Platessa limanda* of ichthyologists. Its surface is rougher than that of the flounder or plaice, and it is better than either as food. It is about eight or nine inches long.

DA CA'PO (from the beginning: *Ital.*) in Music, a phrase signifying that the first part of the tune is to be repeated from the beginning. It is also used as a call or acclamation to the musical performer at concerts, &c., to repeat the air or piece which has just been finished.

DACE, a river fish of the family of the *Cyprinidæ*, the *Leuciscus vulgaris* of ichthyologists; it resembles the roach in habits and appearance, but there are only nine in place of twelve rays in the dorsal fin, and the pectoral, ventral, and anal fins are nearly white.

DA'COIT (*dakhee: Hind.*, a robber). Dacoits are high class Rajpoots, originally from Guzerat, who form gangs for the purpose of robbery, but never commit murder. They were found throughout India, but by the exertions of the government their numbers have been greatly reduced.

DACRYGELO'SIS (*dakru*, a tear; and *gelōs*, laughter: *Gr.*), in Medicine, a species of insanity, in which the person laughs and weeps at the same time

DAC'TYL (*daktulos*, literally the finger. *Gr.*—like the finger, the dactyl has, as it were, one long and two short joints), a foot in Latin and Greek poetry, consisting of a long syllable followed by two short ones: as *dŏmĭnŭs, cārmĭnă.* When combined with spondees consisting of two long syllables, it forms the hexameter, a line of six feet.

DACTYL'IC (*daktulikos*, from *daktulos*, a dactyl: *Gr.*), an epithet for verses which end with a dactyle instead of a spondee.

DACTY'LIOMANCY (*daktulios*, a ring; and *manteia*, prophecy: *Gr.*), a kind of divination among the Greeks and Romans, which was performed by suspending a *ring* by a thread over a table, the edge of which was marked with the letters of the alphabet. As the ring, after its vibration ceased, happened to hang over certain letters, these joined together gave the answer.

DACTYLIOTHE'CA (*daktulios*, a ring; and *thēkē*, a repository: *Gr.*), a collection of engraved gems.

DAC'TYLIS (*daktulos*, a finger: *Gr.*, because it has long and slender spikes, like fingers), a genus of grasses, containing *Cocksfoot grass.*

DACTYLOL'OGY, or DACTYLON'OMY (*daktulos*, a finger; and *logos*, a discourse, or *nomos*, a law: *Gr.*), the art of communicating ideas or thoughts by the fingers; or the art of numbering on the fingers.

DAC'TYLOS (literally, a finger: *Gr.*), the shortest measure among the Greeks, being a *finger's breadth*, or about seven-tenths of an inch. It corresponded to the *digitus* of the Romans.

DA'DO (*Ital.*), the die, or that part in the middle of the pedestal of a column between its base and cornice. It is also the name of the lower part of a wall.

DÆMONOMA'NIA (*daimōn*, a demon; and *mania*, madness: *Gr.*), in the medical writings of the ancients, denoted a madness which was supposed to arise from demoniacal influence.

DAF'FODIL, the popular name of some of the species of Narcissus, nat. ord. *Amaryllidaceæ*. It is a corruption of the Greek word *asphodelos.*

DA'GON (*dag*, a fish: *Heb.*), an idol of the Philistines, of the human shape upwards, and resembling a fish downwards, with a finny tail.

DAGUER'REOTYPE (*Daguerre*, the inventor; and *tupos*, a sketch: *Gr.*), the name given to the process discovered by *Daguerre*, by which all images produced by the camera obscura are retained and fixed in a few moments, by the action of light upon metallic surfaces coated with a salt of silver. The ancient alchymists were aware that a substance washed first with a solution of a salt of silver, and then with a solution of common salt, would become black. Paper wetted in this way, and placed in the camera obscura, so as to receive the image on it, will soon exhibit a *negative* picture; that is, one in which the lights and shadows are *reversed.* Many persons, among others, Wedgewood and Sir H. Davy, attempted in vain to arrest the action of the light when the picture was produced; but ultimately its whole surface became black. At length Niepce and Daguerre discovered a means of effecting this, and were munificently rewarded by the French government. They used for the purpose a silvered copper plate, which, after having been rendered extremely clean, was exposed on its silvered side to the vapour of *iodine*, and then placed in the camera obscura. Having been removed from the latter, without the least appearance of change on its surface, it was exposed in a proper apparatus to the vapour of *mercury*, which caused the landscape, &c., to appear. It was then washed with a solution of *hyposulphite of soda*, to remove the undecomposed salt of silver, and therefore to prevent any further action of the light; and was finally washed with pure water, and carefully dried. The application of chloride of gold fixes the picture. [See PHOTOGRAPHY.]

DAH'LIA (from *Dahl*, a Swedish botanist), a genus of plants, belonging to the *Compositæ*. The species are natives of South America, but have become common in our gardens, and are highly ornamental in the autumn, when other flowers are scarce. The flowers by cultivation have been doubled, and made to assume a variety of colours. They are reproduced from the seed, or by the division of the roots. The roots furnish the Mexicans with a wholesome article of food, though the taste is by no means pleasant.

DA'IRY (*dey*, milk: *Old Eng.*), a building appropriated to the purpose of preserving and managing milk, making butter, cheese, &c. Temperature in a dairy is of the first importance; for if too much heat be admitted, the milk will quickly become sour; and if too cold an atmosphere prevails, neither butter nor cheese making can be carried on with any success. Dairy farms, in general, consist chiefly of meadow and pasture, with only a small portion of the land under tillage; but it has of late years been proved that stall-feeding, with green crops, is most important in the management of cows: for in this way they can be kept in milk through the whole winter season.

DA'IS (a canopy: *Fr.*), in Architecture, a raised platform at the end of a dining-hall, where the table for the principal guests stood; also a seat with a canopy over it.

DA'ISY (*dæges eage*, day's eye: *Sax.*), a well-known wild plant, the *Bellis perennis* of botanists, belonging to the *Compositæ*.

DAM'AGE FEAS'ANT (*dommage faisant*, doing mischief: *Fr.*), in Law, is when one person's beasts get into another's ground, without licence from the owner or occupier of the ground, and do damage, by feeding or otherwise, to the grass, corn, wood, &c., in which case the party injured may distrain or impound them; but at his peril if the accident have happened through his neglect. Possession without title empowers a tenant to distrain in such a case; but the cattle cannot be detained if the owner of the estate offer amends.

DAM'AGES (*dommage*, injury: *Fr.*; from *damnum*, a loss: *Lat.*), in Law, the estimated equivalent for an injury sustained; or that which is given or adjudged by a jury to the plaintiff in an action to repair his loss.

DAM'ASK (same *deriv.*), a textile fabric, with a pattern consisting of figures and flowers, originally from Damascus. Though at first it was made only of silk, other materials are now used, as, for example, in damask table-cloths.——**DAMASK-STEEL**, is a fine kind of steel, used in Damascus for sword-blades, so celebrated for their extraordinary temper.

DAMASKEEN'ING (same *deriv.*), the art of engraving on and inlaying iron or steel with gold or silver.

DAME (lady: *Fr.*), formerly a title of honour for a woman, and the title still given in legal documents to the wife of a baronet.

DAM'NIFY (*damnum*, loss; and *facio*, I cause: *Lat.*), in Law, to cause hurt or damage to; as, to *damnify* a man in his goods or estate.

DAM'PERS, in Music, certain parts in the internal construction of the pianoforte, which are covered with soft leather in order to deaden the vibration, and are acted on by a pedal.——Also, iron plates used to regulate the supply of air to steam furnaces, &c.

DAMPS (*dampf*, vapour: *Germ.*), noxious exhalations, frequently found in mines, coal-pits, wells, and other subterraneous places, and which are deleterious or fatal to animal life. These damps are usually carbonic acid gas, vulgarly called *choke-damp*, which instantly suffocates; or some inflammable gas, called *fire-damp*. The fire-damp, which prevails almost exclusively in coal-mines, is a mixture chiefly of light carburetted hydrogen and atmospheric air, which explodes with tremendous violence whenever it comes in contact with flame. The injuries which formerly occurred so frequently, both to the machinery and to the lives of the miners, arising from the fire-damp, are now greatly diminished by the use of Sir H. Davy's *safety-lamp*. It consists of a cylinder of wire gauze, so placed that air cannot pass to or from the flame, except through it, while it transmits sufficient light for the miners. The flame cannot pass out through the gauze, and therefore cannot set the explosive mixture of gases on fire; although the mixed gas can pass into the flame, and thus be consumed without inconvenience or danger. If the workmen were not so infatuated as to remove the gauze for the purpose of lighting their pipes, candles, &c., this admirable contrivance would, it is probable, totally prevent explosion, and the consequent fearful loss of life and destruction of property which occurs from time to time.

DAM'SEL (*damoiselle: Fr.*), a name anciently given to young ladies of noble or genteel extraction. The word is, however, now seldom used, except jocularly or in poetry. *Damoisel*, or *damoiseau*, the masculine of the same word, appears to have been applied to young men of rank; thus we read of *damsel* Pepin, *damsel* Louis le Gros, *damsel* Richard, prince of Wales. From the sons of kings this appellation first passed to those of great lords or barons, and afterwards to those of gentlemen who were not yet knights. Such is the change which language undergoes, that at the present day the word *damsel* is used only, and even rarely, when speaking of young unmarried women. It occurs frequently in the Scriptures and in poetry.

DANCET'TE (*danser*, to dance: *Fr.*), in Heraldry, is when the outline of any bordure or ordinary is very largely indented.

DAN'CING (same *deriv.*), has been practised by all nations, civilized and barbarous; being by some held in esteem, by others in contempt. It has also often been made an act of religion; thus, David danced before the ark, to honour God and express his excess of joy for its return into Sion; and among the pagans it made a part of the worship paid to the gods, it being usual to dance round the altars and statues. According to Scaliger, the early bishops of the Christian church, on account of their leading the dance in solemn festivals, were styled *præsules*, a name given by the ancients to the priests of Mars, because they were the *præsultatores* (chief dancers: *Lat.*), in the sacred rites of that deity; and this practice continued in the church until the 12th century.

DA'NEGELT (*Dänengeld*, Dane's money: *Germ.*), an annual tax formerly laid on the English nation for maintaining forces to oppose the Danes, or to furnish tribute to procure peace with them. It was first imposed as a continual yearly tax upon the whole nation under king Ethelred about 995. It was levied by William I. and II., but was remitted by Henry I., and finally abolished by Stephen on the day of his coronation.

DA'OURITE, a mineral, called also *rubellite*, of a reddish hue. It is a Tourmaline with a soda base.

DAPH'NE (the laurel: *Gr.*), in Botany a genus of shrubs, nat. ord. *Thymelaceæ*. *Daphne Mezereum* and *Daphne Laureola*, the *spurge laurel*, are British species.

DAPH'NINE (*daphnê*, laurel: *Gr.*), in Chemistry, the bitter principle of the laurel, discovered by Vauquelin. It consists of hard crystals which are of a greyish colour and transparent.

DA'RIC (*dareikos*, from *Darios*, Darius: *Gr.*), in Antiquity, a Persian gold coin, said to have been struck by Darius. It is scarce in collections. Existing specimens weigh about 128½ grains. Silver darics were also struck: specimens exist weighing from 224 to 230 grains.

DA'TA (things given: *Lat.*), among Mathematicians, a term used for such things and quantities as are given, known, or capable of being ascertained, in order to find therefrom other things that are unknown.

DATE (*datus*, given: *Lat.*), because letters, &c., were stated to be 'given' at such and such a time and place, that part of a writing or letter which expresses the day of the month and year.——**DATE**, in Law, is the description of the day, month, and year, with (sometimes) the year of the reign of the king, in which a deed or other writing was executed. An *ante-date* is a date prior to the real time when the instrument was signed. A *post-date* is that posterior to the real time.

DA'TE-TREE, the *Phœnix dactylifera*, a

species of palm which flourishes in North Africa and Western Asia, growing fifty, sixty, and sometimes one hundred feet high, distinguishing the landscape of those countries, and affording the inhabitants food, clothing, &c. The fruit grows in large clusters, is pulpy, firm, sweet, and esculent, and contains a hard kernel.

DATH'OLITE (*daio*, I kindle: and *lithos*, a stone; *Gr.*), in Mineralogy, a borosilicate of lime, found in Norway. It becomes opaque when heated.

DA'TIVE CASE (*dativus*, pertaining to giving: *Lat.*), in Grammar, that inflection of a noun which indicates participation in the action of the verb accompanying it.

DATU'RIA, in Chemistry, a vegetable alkaloid, the poisonous principle of the *Datura Stramonium*.

DAU'CUS (*daukos: Gr.*), in Botany, a genus of plants, nat. ord. *Umbelliferæ*, containing the well known carrot.

DAU'PHIN, the title borne by the eldest son of the king of France, down to 1830. It is said that in 1349, Humbert II., the last of the princes of Dauphiny, having no issue, gave his dominions to the crown of France, upon condition that the king's eldest son should be styled the *Dauphin*. These princes carried a dolphin on their shields.

DA'VID'S DAY (St.), the 1st of March, kept by the Welsh in honour of St. David, bishop of Minevy, in Wales, who, at the head of their forces, wearing leeks to distinguish them, obtained a signal victory over the Saxons. It is the custom of the Welsh to wear leeks in their hats on this day.

DA'VY'S LAMP. [See DAMPS.]

DAY (*dæg: Sax.*), according to the most natural and obvious sense of the word, signifies that part of the twenty-four hours when it is light; or the space of time between the rising and the setting of the sun—the time which elapses from its setting to its rising again being considered the night. In this sense it is termed *artificial* day. The word day is often taken in a larger sense, so as to include the night also, or to denote the time in which the earth makes a complete revolution with respect to the celestial bodies. Hence it expresses different intervals, according as the body with which the earth's rotation is compared is fixed or not. The *astronomical*, called also the *solar* and the *apparent* day, is the time which elapses between two consecutive returns of the same terrestrial meridian to the centre of the sun. Astronomical days are not equal, because the velocity of the earth in its orbit, and by consequence the apparent daily motion of the sun, are greater in winter than in summer; also, the obliquity of the ecliptic causes the sun's apparent daily motion in right ascension to be less at the equinoxes than at the tropics. The astronomical day begins at noon, and is counted on through *twenty-four* hours to the following noon. The *civil*, or *mean solar* day, is the time employed by the earth in revolving on its axis, as compared with the sun, supposed to move at a *mean rate* in its orbit. In this way of reckoning, the days are all of the same length; but the noon, or any given hour of the civil day, sometimes precedes and sometimes comes after the noon or corresponding hour of the astronomical day. Most nations begin the civil day at mean midnight. The Babylonians, Syrians, and Persians, like the modern Greeks and the natives of the Balearic isles, began their day at sunrise; the Jews, ancient Athenians, Chinese, and other orientals, at sun-setting; and the ancient Egyptians at noon. The *sidereal* day is the period which elapses between the times at which a star passes over the meridian on two successive days. The most ancient astronomical observations show that this interval has always remained of the same length. It is divided into twenty-four sidereal hours, which are subdivided into sidereal minutes and seconds. It is used universally by astronomers in their observatories, though its commencement is still determined by the apparent passage of the sun across the meridian.——DAYS OF GRACE, in Commerce, a customary number of days allowed for the payment of a bill after it becomes due. *Three* days of grace are allowed in Great Britain and America. In other countries the time allowed is much longer, but the merchants very rarely avail themselves of the time.

DAY'COAL, a name given by miners to the upper stratum of coal.

DAY'FLY, a species of the family of the *Ephemeridæ*, an insect so called from the shortness of its existence, because, after it has become a perfect fly, it lives only a few hours. Its larva, however, lives in the aquatic state two or three years.

DAY'-LILY, the popular name of a species of *Hemerocallis*; a plant so called because the beauty of its flower seldom lasts longer than one day.

DAZE (*dwas*, to overwhelm with light: *Sax.*), in Mineralogy, a kind of glittering stones found in tin and lead mines.

DE'ACON (*diakonos*, an attendant: *Gr.*), the lowest of the three orders of clergy (bishops, priests, and deacons) in the English church. The word is sometimes used in the New Testament for anyone that ministers in the service of God; in which sense bishops and presbyters are styled deacons. In the church of England, the form of ordaining a deacon declares that it is his office to assist in the distribution of the holy communion, in which, agreeably to the practice of the ancient church, he is confined to the administration of the wine to the communicants. He may not pronounce the absolution. He is not capable of any ecclesiastical promotion; yet he may be chaplain to a family, curate to a beneficed clergyman, or lecturer to a parish church.——In the Roman Catholic church, the deacon's office is to incense the officiating priest, to incense the choir, to put the mitre on the bishop's head at the pontifical mass, and to assist at the communion He is attended by the *sub-deacon*, who, according to the doctrine of that church, being in one of the holy orders, is bound to celibacy, &c.——In Presbyterian and Independent places of worship, the deacons distribute the bread and wine to the communicants. 2.—In Scotland, an overseer of the poor, or the master of an incorporated company, is styled a *deacon.*

DE'ACONESS (same *deriv.*), a female deacon in the primitive church. This office appears as ancient as the apostolic age; for St. Paul calls Phœbe a servant of the church of Cenchrea. One part of her office was to assist the minister at the baptizing of women, to undress them for immersion, and to dress them again, that the whole ceremony might be performed with all the decency becoming so sacred an action.

DEAD'-EYES, in Sea language, a kind of blocks with many holes in them, by which the shrouds are fastened to the chains.

DEAD LAN'GUAGE, a language which is no longer spoken, or in common use by a people, and is known only in writings; as the Hebrew, Greek, and Latin.

DEAD'-LIGHTS, strong wooden ports, made to fit the cabin windows, in which they are fixed to prevent the water from entering the ship in a storm.

DEAD'-POINTS, two positions in the revolution of an axle driven by reciprocating motion, in which the driving force is nil. To obviate the difficulty thus arising, the fly-wheel was invented.

DEAD-RECK'ONING, in Navigation, the calculation made of a ship's place, by observing the way she makes by the log, and allowing for currents, &c., no recourse being had to observation.

DEAD'-WATER, the eddy water closing in with a ship's stern as she passes through the water.

DEAD'-WORKS, the parts of a ship which are above the surface of the water when she is trimmed for a voyage.

DEAF'NESS, a defect in the power of hearing, which may arise:—1. From the disease or some impairment of the auditory nerve; 2. From a partial or complete destruction of the *membrana tympani*, the membrane which receives those vibrations of the air which constitute sound: this may be the result of disease or accident; 3 From disease of the ossicles; 4. From a collection of wax in the auditory canal, preventing the due transmission of the vibrations to the *membrana tympani;* 5. From an enlargement of the tonsils, when they press upon the eustachian tube, the canal which communicates with the middle ear [see EAR].

DEAL (*delan*, to divide: *Sax.*), fir-planks of different thicknesses, brought from the north of Europe, the produce of the spruce fir (*Abies excelsa*). When the pieces are 7 inches broad they are called *battens;* when 9 inches broad, *deals*; and when 11 inches broad, *planks* Some North American spruce firs are also applied to the same purpose, especially the black and white kinds, *Abies nigra*, and *A. alba.*

DEAN (*decanus: Lat.*), a dignitary of the church of England, next to a bishop, and head of the chapter in a cathedral or council. ——The DEAN AND CHAPTER form a corporate body, in which is vested the property of the cathedral, and the management of the estates belonging to it.

DEATH (*Sax.*), total and permanent cessation of all the vital functions, when the organs have not only ceased to act, but have lost the susceptibility of renewed action.——In Law, there is a natural death and a civil death: *natural*, where actual death takes place; *civil*, where a person is not actually dead, but adjudged so by law; as by banishment, abjuration of the realm, &c.

DEATH'-WATCH, a small beetle belonging to the timber-boring genus *Anobium*, is remarkable for striking with the fore part of its head against paper or some other material, and thus making a ticking noise, like the beat of a watch, which by ignorant and superstitious people is supposed to be a presage of death. It is of a greyish-brown colour, and about a quarter of an inch in length The ticking is merely the mode of call which the male insect makes for its mate The larva is very destructive to furniture, books, &c. An instance occurred of twenty-seven volumes in a public library having been perforated by the larva of an *Anobium*, in such a way that a string could be passed through the holes, and the volumes could then be all lifted together.

DEBA'CLE (a breaking up of ice: *Fr.*), a Geological term, to designate a violent rush of waters, which, overcoming all opposing barriers, carries with it stones, rocks, &c., and spreads them in all directions.

DEBEN'TURE (*debeo*, I owe: *Lat.*), a term used at the custom-house for a certificate signed by an officer of the customs, which entitles a merchant exporting goods to the receipt of a bounty, or a drawback of duties.——It is also an instrument, in use in some government departments, by which the government is charged to pay a creditor or his assigns the sum found due on auditing his accounts.——Also, an instrument by which a public company acknowledges the borrowing of a sum of money, and undertakes to repay the amount with interest.

DEB'IT (*debitum*, a debt: *Lat.*), a term used in Book-keeping to express the left-hand page of the ledger, to which all articles are carried that are charged to an account.

DEBOUCH' (*déboucher*, to clear a way: *Fr.*), in Military language, to issue or march out of a narrow place, or from defiles.

DE'BRIS (*Fr.*), ruins or rubbish: applied particularly to the fragments of rocks.——The word *débris* is also used by the French to express the remains or wreck of an army that has been routed

DEBT (*debitum: Lat.*), in Law, a species of contract, by which one party is bound to pay the other a certain sum of money. A debt of *record* is a sum which appears to be due by the evidence of a court of record; a debt by *special contract*, or *specialty*, is a sum which is acknowledged to be due, or becomes due by instruments under seal; and a debt by *simple contract* is either by parole, or a written obligation unsealed, as by a bill of exchange, a promissory note, &c.——NATIONAL DEBT, the engagement entered into by a government to repay at a future period money advanced by individuals for public service, and to pay the lenders an interest agreed upon.

DEC'ACHORD, or DECACHORD'ON (*dekachordos:* from *deka*, ten; and *chordē*, a musical string: *Gr.*), a musical instrument of ten strings.

DEC'AGON (*deka*, ten; and *gōnia*, an angle: *Gr.*), in Geometry, a plane figure with ten sides and ten angles.

DE'CAGRAMME (*deka*, ten: *Gr.;* and *gramme*), a French weight of ten grammes, equal to 154·34 grains troy.

DECAHE'DRON (*deka*, ten; and *hedra*, a base: *Gr.*), in Geometry, a figure or body having ten sides.

DE'CALITRE (*deka*, ten: *Gr.;* and *litre*), a French measure of capacity, containing ten litres, or 610·28 cubic inches: the litre being rather less than our imperial quart.

DEC'ALOGUE (*deka*, ten; and *logos*, a discourse: *Gr.*), the ten commandments or precepts delivered by God to Moses, at Mount Sinai, originally engraved on two tables of stone.

DECAM'ERON (*deka*, ten; and *hēmera*, a day: *Gr.*), a work in Italian prose, written by Giovanni Boccaccio, and first published about 1352. It consists of one hundred tales, supposed to have been related during ten days, in a villa in the country, by a party who had assembled there to escape the plague which raged at Florence in 1348. It was arranged that each of the party should relate a story daily for the entertainment of the others. The beautiful country around Florence is described, and the rambles and repasts of the recluses are recorded. 'These stories,' says Sismondi, 'which are varied with infinite art, as well in subject as in style, from the most pathetic and tender to the most sportive, and unfortunately the most licentious, exhibit a wonderful power of narration; and his description of the plague in Florence, which serves as an introduction to them, may be ranked with the most celebrated historical descriptions which have descended to us. The perfect truth of colouring; the exquisite choice of circumstances, calculated to produce the deepest impression, and which place before our eyes the most repulsive scenes without exciting disgust; and the emotion of the writer, which insensibly pervades every part, give to this picture that true eloquence of history, which in Thucydides animates the relation of the plague in Athens. With regard to the stories themselves, it would be difficult to convey an idea of them by extracts, and impossible to preserve in a translation the merits of their style. The merit of Boccaccio consists in the perfect purity of his language, in his elegance, his grace, and, above all, in that *naïveté*, which is the chief merit of narration, and the peculiar charm of the Italian tongue.

DEC'AMETRE (*deka*, ten: *Gr.;* and *mètre*), a French measure of length, consisting of ten mètres, or 393·7 inches.

DECAN'DRIA (*deka*, ten; and *anēr*, a male: *Gr.*), the tenth class of the Linnæan system of plants, containing plants with flowers having ten stamens.

DECARBONIZA'TION (of cast iron), a process resorted to in order to convert cast iron into steel and malleable iron, by removing a portion of the carbon it contains.

DEC'ASTICH (*deka*, ten; and *stichos*, a line: *Gr.*), a poem consisting of ten lines.

DEC'ASTYLE (*deka*, ten; and *stulos*, a column: *Gr.*), in Architecture, a building with ten columns in front.

DECEM'BER (*Lat.*, from *decem*, ten), the last month of the modern year. About the 21st of this month, the sun enters the tropic of Capricorn, and makes the winter solstice. It was so called from being the tenth month in the Roman year, which began with March.

DECEM'VIRI (*decem*, ten; and *viri*, men: *Lat.*), a body of men who, according to the Roman traditions, were elected by the patricians, A.U.C. 302, for the purpose of drawing up a body of laws, founded on the most approved institutions of Greece. They compiled a code, which they inscribed on ten tables, and stated that their labours were not yet complete. Next year, therefore, another body of ten, which probably included some of the patricians, was appointed with the same powers; and these added two more tables, altogether making the famous *twelve tables*, which were, from that time, the foundation of all Roman law. The second body of decemvirs attempted to prolong their period of office, committed some acts of violence, and altogether gave such dissatisfaction, that they were dissolved. The traditionary history of the decemviri is, however, very doubtful. There were other decemvirs, who were appointed for judicial and other purposes.

DECEN'NARY (*decem*, ten: *Lat.*), in Law, a tithing consisting of ten freeholders and their families. Ten of these decennaries constituted a *hundred*, the origin of which is ascribed to Alfred.

DECID'UOUS (*deciduus*, that falls off: *Lat.*), an epithet chiefly used in Botany; as, *deciduous leaves*, those which fall in autumn, in distinction from those of evergreens. The calyx or cup of a flower is also said to be *deciduous* when it falls off or decays along with the flower petals; while, on the contrary, it is called *permanent* when it remains after these are fallen.

DE'CIGRAMME (*decimus*, the tenth: *Lat.;* and *gramme*), a French weight of one-tenth of a gramme, equal to 1·5434 grs. troy.

DE'CILITRE (*decimus*, the tenth: *Lat.;* and *litre*), a French measure of capacity, equal to one-tenth of a litre.

DE'CIMAL ARITH'METIC (*decimus*, belonging to ten: *Lat.*), the ordinary system, in which *decimal numbers* are used. Decimal numbers are those whose values increase or decrease in a *tenfold* ratio.

DE'CIMAL COINAGE. A system in which the computation is made in parts of ten with coins to correspond, is manifestly attended with great convenience, and has been adopted in France and some other countries. Attachment to established usage, and the apprehension of ill effects arising from a change, have hitherto prevented the adoption of such a system with us; but when the benefits are more clearly perceived, the public will not hesitate about it. The advantage of a decimal system will be appreciable in every calculation. There will, moreover, be a great saving of time in the teaching of pecuniary arithmetic, and hence a decimal system would further education.

DE'CIMAL FRAC'TIONS, a method of expressing fractions of unity, in parts of 10, 100, 1000, &c. It is usual to express in writing the numerator only, putting a point before it on the left hand, thus:—·2 is equal to $\frac{2}{10}$, ·25 = $\frac{25}{100}$, ·575 = $\frac{575}{1000}$. Cyphers on the right hand of decimals make no alterations in their value: thus, ·20 is exactly the same as ·2 But cyphers on the left hand of decimals decrease their value, for ·5, ·05, ·005 are equal to $\frac{5}{10}$, $\frac{5}{100}$, and $\frac{5}{1000}$. All figures to the left of the point · express whole numbers; and a series of figures, some of which are to the left, and some to the right of a decimal point, form a mixed number, thus: 25·75 = 25$\frac{75}{100}$. In order to reduce a vulgar fraction to a decimal fraction of equal value, we annex cyphers to the numerator until it is equal to a greater sum than the denominator, then dividing it by the denominator, the quotient will be the decimal fraction required.

DECIMA'TION (*decimatio*, from *decimus*, the tenth: *Lat.*), a punishment inflicted by the Romans on such soldiers as quitted their post, or behaved badly in the field. The names of all the guilty were put into an urn or helmet, from which a tenth part only were drawn, whose lot it was to suffer death. Those who escaped received barley, instead of wheat, for food.

DE'CIMETRE (*decimus*, the tenth: *Lat.*; and *mètre*), a French measure of length, equal to the tenth part of a mètre, or to 3·937079 inches.

DECK (*decan*, to adorn: *Sax.*), the planked floor of a ship from stem to stern. Small vessels have only one deck; larger ships have two or three decks. Thus, speaking of the size of a large ship, we say, she is a *two-decker*, or a *three-decker*.

DECK'ED (same *deriv.*), in Heraldry, a term applied to an eagle, or other birds, when their feathers are trimmed at the edges with a small line of another colour.

DECLAMA'TION (*declamatio*: *Lat.*), the act of speaking to a public audience with energy and grace; it may be a discourse addressed either to the reason or to the passions. Among the Greeks, declamation was the art of speaking indifferently on all subjects and on all sides of a question. With us it is more especially applied to the speeches of students in colleges, practised for exercise in oratory. The term is, however, often used contemptuously, to denote a noisy harangue. The Romans employed the expression only in the sense of pleading at the bar.

DECLARA'TION (*declaratio*, an exposition: *Lat.*), in Law, that part of the process or pleadings in a common law court in which a statement of the plaintiff's complaint against the defendant is set forth.——DECLARATION OF WAR, a public proclamation made by a herald-at-arms to the subjects of a state, declaring them to be at war with some foreign power, and forbidding all and every one to aid or assist the common enemy at their peril.

DECLEN'SION (***declino***, I vary or inflect: *Lat.*), in Grammar, the inflection of cases to which nouns are subject. Also, the act of going through these inflections.

DECLINA'TION (*declinatio*, a bending aside: *Lat.*), in Astronomy, the distance of any star or point of the heavens from the equator, either north or south, and measured on the great circle, which passes through the centre of the star or point, and the poles. When the sun is in the equinoctial, he has no declination, and illuminates half the globe from pole to pole. As he increases in north declination, he gradually shines further over the north pole, and leaves the south pole in darkness; and *vice versâ*. The sun's greatest declination, north or south, is 23½ degrees.——DECLINATION OF THE COMPASS, the variation of the needle from the true meridian of a place. At most places on the earth's surface, the needle does not coincide, but forms an angle, with the geographical meridian. Lines on a map connecting places at which the needle is deflected to the same extent from the geographical meridian are called *isogonal* lines. Lines which connect places where the needle coincides with the geographical meridian are called lines of no declination.

DECOC'TION (*decoctio*, from *decoquo*, I boil down: *Lat.*), a medicinal liquor, made by extracting the soluble and efficacious part of many drugs, particularly of barks, woods, seeds, roots, &c., by boiling. It differs from *infusion*, which is merely pouring boiling water upon them.

DECOLLA'TION (*decollatio*, from *decollo*, I take off from the neck: *Lat.*), the act of beheading, a term used in the phrase 'decollation of St. John the Baptist.'

DECOM'POSITE (*de*, out of; and *compono*, I put together: *Lat.*), a botanical term applied to leaves of plants when the primary leaf is so divided that each part forms a compound leaf, and to flowers which contain within a common calyx several that are smaller.

DECOMPOSI'TION (*de*, equivalent to the English *un*; and *compono*, I put together: *Lat.*), in Chemistry, the act of separating the constituent parts of a substance. It differs from mechanical division, as the latter effects no change in the properties of the body divided, whereas the parts chemically decomposed have properties very different from those of the substance itself.

DECOY', in a general sense, any lure that deceives and misleads. Also a sea term for a stratagem employed by ships of war to draw any vessel of inferior force into an incautious pursuit, until she comes within gunshot. Decoying is also performed to elude the chase of a ship of superior force in a dark night; and this is done by committing to the sea a lighted cask of pitch, which will burn for a considerable time, and misguide the enemy As soon as the cask is lowered, the ship changes her course, and thus, if at any tolerable distance from the foe, escapes with facility.——DECOY, among sportsmen, a place for catching wild fowl.——DECOY-DUCK, a wild duck trained to decoy others into the decoy, or place where they may be caught.

DECREE' (*decretum: Lat.*), in Civil Law, the decision of the emperors on cases submitted to them.——In Law, the judgment of a court of equity on any bill preferred. A decree is *interlocutory* when made during the progress of a suit on some minor matter in dispute, and *final* when it goes to the whole matter in question. Decrees of the inferior judges may be appealed from to the Lords Justices, or to the Lord Chancellor, and from them to the House of Lords. A decree may also be appealed against in the House of Lords.

DEC'REMENTS (*decrementum*, a diminution: *Lat.*), in Physics, the small parts by which a variable and decreasing quantity becomes less and less.

DECREPITA'TION (*de*, much; and *crepito*, I crackle: *Lat.*), in Chemistry, a term applied to the crackling noise of salts when exposed to heat, by which they are quickly split. It takes place in those salts that have little water of crystallization, or some between their plates, &c., if, like nitre, they have no water of crystallization—the increased temperature converting that small quantity into vapour by which the crystals are suddenly burst. Common salt affords a good example of decrepitation, and when used as a flux should be previously decrepitated.

DECRESCEN'DO (*Ital.*), or DIMINUENDO, in Music, the term for gradually decreasing or weakening the sound; as opposed to *crescendo*.

DECRES'CENT (*decrescens*, decreasing: *Lat.*), in Heraldry, a term denoting the state of the moon when she declines from the full to her last quarter, and the horns are turned to the sinister side of the escutcheon.

DECRET' (*decretum*, a decree: *Lat.*), in Scottish Law, a term applied to various judgments and sentences.

DEC'RETAL (same *deriv.*), a decree of the pope which, until the 14th century, had the same authority in canon law as that of an emperor in the civil law. The *Decretals of Isidore*, framed with a view to extend the papal power, pretend to contain the decrees of popes who lived in the first three centuries; but they were forged in the ninth.

DECUM'BENT (*decumbens*, lying down: *Lat.*), in Botany, an epithet for anything which lies on the ground.

DECUM'BITURE (same *deriv.*), in Astrology, the scheme or aspect of the heavens, by which the prognostics of recovery or death were supposed to be discovered.

DECU'RION (*decurio*, from *decem*, ten: *Lat.*), in Roman Antiquity, the commander of a *decuria* of cavalry. The cavalry belonging to a legion were divided into ten *turmæ* or troops; and for each of these, three decurions were chosen. In each troop, the decurion first chosen commanded the whole troop, but without changing his appellation.

DECU'RIO'NES MUNICIPA'LES (municipal decurions: *Lat.*), a court of judges or councillors representing the Roman senate in the free towns and provinces.

DECUR'RENT (*decurrens*, running along: *Lat.*), an epithet for a leaf which adheres to the stem forming a wing along it.

DECUS'SATE (*decussatio*, the intersection of two lines: *Lat.*), in Botany, a term applied to leaves which are set in pairs along a branch, each pair being at right angles to the one below it.——In Rhetoric, a *decussated* period is one that consists of two rising and two falling clauses, placed in alternate opposition to each other.

DE'DALOUS (from *Dædalus*, the contriver of a famous labyrinth), a Botanical term applied to leaves of a delicate texture, whose margin is marked by various windings and turnings.

DEDICA'TION (*dedicatio*, from *dedico*, I consecrate: *Lat.*), the act of consecrating or solemnly devoting any person or thing to the service of God and the purposes of religion.——FEAST OF DEDICATION, an anniversary festival among the Jews, in memory of Judas Maccabæus, who repaired and dedicated anew the temple and altar, which had been plundered and profaned by Antiochus Epiphanes. It was observed on the twenty-fifth of Cisleu, and continued eight days.——In Literature, a complimentary address to some one, prefixed by an author to his work. This practice is ancient, but it has gone much out of fashion.

DEDUC'TIVE METHOD OF IN'QUIRY, the pursuit of laws into their consequences. [See INDUCTION.] 'The successful process of scientific inquiry,' says Sir John Herschel, 'demands continually the alternate use of both the inductive and the deductive method.'

DEDUC'TOR (*Lat.*), a client amongst the Romans, who called upon his patron at his lodgings in the morning, waited upon him from thence to the forum, and attended him upon all public occasions.

DEED (*dæd: Sax.*), in Law, a writing sealed and delivered by the parties. If made by only one party, it is a *deed-poll*; if by two or more, an *indenture*. The essential parts of a deed are the *date* and *names* of the parties: the *recitals*, in which the intention of the parties, and former transactions with reference to the same property, are recounted, and the operative part, which tells the *considerations* for which the deed is made; the *conveyance* by and to the several parties; the *description* of the tenements, their legal adjuncts; the *habendum*, beginning with 'to have and to hold,' expressing the quantity of estate conveyed; the *declaration of uses*, which limits or modifies the enjoyment to one or more parties, according to stipulations previously made; the declaration of trusts, if any; and lastly, the covenants for title, and such as may be required by the peculiar circumstances of the case. It must be signed and sealed by the grantor, and also by the grantee, if he has entered into any engagement or covenant. Witnesses usually attest the deed; but this is indispensable only where, a power having been given to be executed by the deed, the terms of the power require such attestation.

DEER. Animals of the deer kind constitute the tribe *Cervina* of naturalists, a division of the ruminating *Bovidæ*. The **ELK**, **REIN DEER**, **FALLOW DEER**, and the True Stags belong to the *Cervina*, the latter including the Common Stag or Red Deer, the **WAPITI** Deer, the spotted Axis Deer of India, the Rusa Stag and Muntjak of Java, the **ROEBUCK**, and some other species. The Red Deer (*Cervus elaphus*) is a native of Europe and the temperate parts of Asia. Its fur has a brown colour, and its horns are conical with numerous branches. It is no longer wild in England, where the hunting of it afforded so much sport to the nobility of the olden time, but in Scotland it still runs wild over the extensive moors, and many are brought down annually by the rifle of the deer-stalker. The sovereign keeps a pack of stag hounds, and until lately there was a master of the buck hounds, one of the great officers of the royal household. The fallow deer has taken its place in parks.

DE FAC'TO (in fact: *Lat.*), in Law, something actually in fact, or existing, in distinction from *de jure*, where a thing is only so in justice, but not in fact: thus a king *de facto* is a person that is in actual possession of a crown, and a king *de jure* is the person who has a just right to the crown, though he may not be in possession of it.

DEFAMA'TION (*defamatus*, dishonoured: *Lat.*), the malicious uttering of falsehood with a view to injure another's reputation. Defamatory words, signs, pictures, &c., written or printed and published, constitute a *libel*.

DEFAULT' (*défaut: Fr.*), in Law, the omission of any act which a party ought to do to entitle himself to a legal remedy or defence, such as non-appearance in court on a day assigned. If the plaintiff make default, he is nonsuited; if the defendant, judgment by default passes against him. Suffering judgment by default entitles the plaintiff to issue execution after the damages, if damages are in question, have been ascertained.——**DEFAULTER**, one who fails to account for money entrusted to his care.

DEFE'ASANCE (*défaire*, to rid oneself of: *Fr.*), in Law a collateral deed, made at the same time with a deed of conveyance, containing conditions by the performance of which the estate created by the deed of conveyance may be defeated. A *defeasance* on a bond, recognizance, or judgment recovered, is a condition which, when performed, renders the bond, &c., of no effect.

DEFECA'TION (*defæco*, I cleanse from dregs: *Lat.*), the act of separating from lees or dregs.

DEFEN'CE (*defendo*, I defend: *Lat.*), in Law, the reply which the defendant makes after the declaration is produced.——In Military affairs, any work that covers or defends the opposite posts, as flanks, parapets, &c.

DEFEN'DANT (same *deriv.*), in Law, the party that is summoned into court, and *defends*, denies, or opposes the demand or charge, and maintains his own right. It is applied whether the person defends, or admits the claim and suffers a default.

DEFI'LE (*défiler*, to advance in a line: from *fil*, a thread: *Fr.*), a narrow way or pass, through which a company of soldiers can march only in file.

DEFINI'TION (*definitio*, from *definio*, I limit: *Lat.*), the determining the nature of things by words; or a brief description of a thing by its properties. It is generally effected by adding to a generic word the essential and peculiar qualities or circumstances of the thing to be defined. But a strictly accurate definition cannot always be given; and the most simple things are generally the least capable of definition, from the difficulty of finding terms more simple and intelligible than the one to be defined.

DEFIN'ITIVE (*definitivus*, from same: *Lat.*), a term applied to whatever terminates a process, question, &c., in opposition to provisional and interlocutory.——In Grammar, a word used to define or limit the extent of the signification of an appellative or common noun.

DEFLAGRA'TION (*deflagratio*, from *deflagro*, I consume by fire: *Lat.*), rapid combustion, or the act of burning two or more substances together, as charcoal and nitre.

DEFLEX'ION (*deflexio*, from *deflecto*, I bend aside: *Lat.*), the bending anything out of its proper direction, as the turning a ship out of her due course by currents, or the bending of an iron bar by a weight.——**DEFLEXION OF THE RAYS OF LIGHT**, in Optics. When a luminous ray passes very near to an opaque body, it is *deflected* or bent from its rectilinear course. This phenomenon, first remarked by Grimaldi, was examined by Newton, who gave it the name of *diffraction*, which see.

DEFLORA'TUS (*defloreo*, I shed blossoms: *Lat.*), in Botany, an epithet for a flower which has discharged its pollen.

DEFLU'VIUM (a falling off: *Lat.*) in Botany, a disease in trees in which they lose their bark.——**DEFLUVIUM CAPILLORUM**, in Medicine, a preternatural falling off of the hair.

DEFLUX'ION (*defluxio*, from *defluo*, I flow down: *Lat.*), in Surgery, the falling or flowing of humours from a superior to an inferior part of the body; as a defluxion from the nose in catarrh.

DEFOLIA'TION (*de*, privative; and *foliatus*, having leaves: *Lat.*), the shedding of leaves, a term technically applied to the fall of leaves in the autumn.

DEFO'RCEMENT (*de*, from; and *forcement*, forcibly: *Fr.*), in Law, the holding of lands or tenements to which another person has a right. In Scotland it denotes the resisting an officer in the execution of the law.

DEGRADA'TION (*de*, privative; and *gradus*, a station: *Lat.*), in Ecclesiastical affairs, the depriving a person of his dignity and degree; as the degradation of a clergyman by depriving him of holy orders. In the Roman Catholic church it is done with many ceremonies, which are intended to strike the beholders with horror. The vestments of the person to be degraded are dragged off; the unction applied to his hands at his ordination is, as it were, scraped off, by a piece of rough iron. Pope Boniface required that there should be six bishops at the degradation of a priest.——In Military affairs, the depriving an officer of his commission.——In Painting, lessening and obscuring remote objects in a landscape, that they may appear as they would do to the eye of a distant observer.

DEGRA'DED (*dégrader*, to degrade : *Fr.*; from *gradus*, a step : *Lat.*), in Heraldry, an epithet in blazoning for a cross that has steps at each end.

DEGREE' (*degré : Fr.*). Every circle is supposed to be divided into three hundred and sixty parts called degrees, and each degree into sixty other parts called minutes; each of these minutes being again divided into sixty seconds, each second into as many thirds, each third into fourths, and so on.——DEGREE, in Universities, a distinction of rank, intended to denote a certain amount of proficiency in a faculty or a science. The first degree is that of *Bachelor of Arts*, the second that of *Master of Arts*. Honorary degrees are those of *Doctor of Divinity*, *Doctor of Laws*, &c. Physicians also receive the degree of *Doctor of Medicine*.——DEGREE, in Algebra, a term applied to equations to distinguish the highest power of the unknown quantity.——DEGREE, in Genealogy, an interval of relationship between persons more or less nearly allied.——The division, space, or interval, marked on a mathematical or other instrument, as on a thermometer or barometer.

DEGRE'E OF LAT'ITUDE, and LON'GITUDE. A distance on the meridian which will cause a difference of one degree in the altitude of the pole is a degree of *latitude*. A degree on the equator, or any great circle of the earth parallel to the equator, is a degree of *longitude*. To ascertain the length of a degree of latitude has been a problem of great interest from the earliest times. Its solution is rendered extremely difficult by the irregularities of the surface of the earth. The mean of the most careful measurements indicates the length of a degree of latitude at the equator to be 362,734 English feet, and at the pole 366,361 ; and a degree of longitude at the equator, 365,152.

DEHIS'CENCE (*dehisco*, I gape : *Lat.*), in Botany, a term given to the opening of the capsules of a plant.

DEIFICA'TION (*Deus*, God ; and *facio*, I make: *Lat.*), the act of enrolling among the heathen deities.

DE'I JUDI'CIUM (the judgment of God : *Lat.*), the old Saxon trial by ordeal, so called because it was supposed to be an appeal to God.

DEIPNOS'OPHIST (*deipnon*, a meal; and *sophistes*, a learned person : *Gr.*), one of an ancient sect of philosophers, who were famous for their learned conversation at meals.

DE'ISTS (*Deus*, God : *Lat.*), in the modern sense of the word, are those persons who acknowledge the existence of a Creator, but do not admit that he has made in words any revelation of his will to mankind.

DE'ITY (*Deus*, God : *Lat.*), the nature and essence of the Supreme Being; a term frequently used in a synonymous sense with God.——Also, a fabulous god or goddess; as Jupiter, Juno, Apollo, &c. The works of Pliny, Cicero, &c., clearly show us that enlightened pagans had not those gross ideas regarding the Deity which are indicated by the heathen mythology.

DELACRYMA'TION (*delacrymatio : Lat.*), a preternatural discharge of watery humours from the eyes.

DEL CRED'ERE (*credere*, to trust : *Ital.*), in Commerce, a term expressive of a guarantee given by factors, who for an additional premium warrant the solvency of the parties to whom they sell goods upon credit.

DEL'EGATE (*delego*, I commit to : *Lat.*), in the United States of America, a person elected or appointed to represent a state or district in the congress.

DELF, a kind of potter's ware, originally made at *Delft* in Holland ; it is covered with an enamel, or white glazing, in imitation of porcelain.

DELIQUES'CENCE (*deliquesco*, I melt away : *Lat.*), in Chemistry, spontaneous liquefaction in the air; a term applied to certain saline bodies that absorb moisture from the atmosphere.

DELIR'IUM (madness : *Lat.*), a state in which the ideas of a person are wild and irregular, or do not correspond with the truth, or with external objects. It may be defined symptomatic derangement, or that which is dependent on some other disease, in distinction from idiopathic derangement or *mania*.

DELIV'ERY (*delivrer*, to deliver : *Fr.*), a part of oratory, referring to the management of the voice.

DEL'LA ROB'BIA WARE, a species of earthenware, the foundation of which is terra cotta, upon which a metallic colour is fixed by the action of fire. The Egyptians were acquainted with the art ; it was revived in the 15th century by Luca della Robbia, an Italian. He began with white figures on a blue ground, afterwards he added more colouring, and then he introduced perspective.

DELPHIN'IDÆ (*delphin*, a dolphin : *Lat.*), a family of *Cetacea*, mammals living in the sea, characterized by the moderate size of the head, and the presence of teeth in both jaws. It includes not only the dolphin, porpoise, and narwhal, but also some animals usually called whales. [See DOLPHIN.]

DELPHIN'IUM (*delphin*, a dolphin : *Lat.*, from a fancied resemblance in the flower), in Botany, a genus of plants, nat. ord. *Ranunculaceæ*, including the common Larkspur.

DEL'TA (the Greek letter Δ), the large tract of land formed by the sediment brought down by a river, and deposited in a lake or quiet ocean. Deltas have been formed at the mouths of the Nile, the Ganges, the Mississippi, and many other great rivers.

DEL'TOID (*delta*, the Greek Δ ; and *eidos*, form : *Gr.*), in Anatomy, a thick triangular muscle of the arm, being one of the three elevators.——Also, a term for anything hav ing three angles, of which the terminal one is much further from the opposite side than the lateral ones.

DEMAIN' or **DEME'SNE** (*domaine: Fr.*; from *dominus*, a lord: *Lat.*), in Law, a manor-house, and the lands thereunto belonging. It denotes also all the parts of any manor not in the hands of freeholders; and is frequently used for those lands that the lord has in his own hands, to distinguish them from other land appertaining to the manor, and belonging to freeholders or copyholders.

DEMARCA'TION (*Fr.*), LINE OF, every line drawn for determining a border which is not to be passed.

DEM'I-CADENCE (*demi*, half: *Fr.*), in Music, an imperfect cadence, or one that falls on any other than the key note.

DEMI CUL'VERIN, a piece of ordnance, which carried a nine-pound shot.

DEM'I-GORGE, in Fortification, that part of the polygon which reaches from the curtain to the angle of the polygon.

DEM'I-QUAVER, the same as *semi-quaver*, which see.

DEM'I-SEMI'QUAVER, in Music, a note equal in length to half a semi-quaver.

DEM'I-VOLT (*demi*, half: *Fr.*; and *volta*, a turn: *Ital.*), one of the artificial motions of a horse, in which he raises his fore-legs in a particular manner.

DEMI'SE (*demissio: Lat.*), in Law, signifies a grant by lease of heritable property. It may be either for life or years. ——The death of a king, or of a queen regnant, is termed the demise of the crown, by which is implied a transfer of the royal authority or kingdom to a successor.

DEMOC'RACY (*dēmokratia*: from *dēmos*, the people: and *kratos*, power: *Gr.*), a form of government in which the supreme power is lodged in the hands of the people collectively, or in which the people exercise the powers of legislation.

DE'MON, or **DÆ'MON** (*daimōn*, a spirit: *Gr.*), a name used by the ancients for certain supernatural beings, in whose existence they believed. They were spirits or genii, who appeared to men, either to do them service or to hurt them. The Platonists distinguish between gods, demons, and heroes; the demons being those since called angels. Socrates and Tasso declared, in very distant ages, they were each attended by a demon or familiar. In Tasso, this pretension has been referred to a hypochondriacal state of mind: in Socrates, the matter has given rise to much speculation. From the manner, however, in which the philosopher is said to have described his *demon*, there seems good reason to believe that he spoke figuratively of his natural conscience or intellect: 'it directed him how to act in every important occasion of life, and restrained him from imprudence of conduct.'

DEMO'NIAC (*daimonikos*, possessed by a demon: *Gr.*), a human being whose volition and other mental faculties are supposed to be overpowered, restrained, or disturbed in their regular operation, by an evil spirit. ——In Church History, the term *Demoniacs* is applied to a branch of the Anabaptists, whose distinguishing tenet is, that at the end of the world the devil will be saved.

DEMONOC'RACY (*daimōn*, a demon; and *kratos*, power: *Gr.*), the power or government of demons.

DEMONOL'OGY (*daimōn*, a demon; and *logos*, a discourse: *Gr.*), a treatise on demons or evil spirits. The Greeks imputed madness sometimes to the agency of Furies, and sometimes to the influence of Diana or the moon. The Romans thought insanity was caused by Ceres or the Larvæ; and amongst the Jews, 'to have a devil' and 'to be mad' were synonymous terms. Everything, in short, which affected either the body or the mind in an extraordinary manner—every disagreeable phenomenon which they could not otherwise account for—was by the Jews supposed to be the work of a devil.

DEMONSTRA'TOR (*Lat.*, from same), in Anatomy, one who exhibits the parts when dissected.

DEMUL'CENTS (*demulceo*, I sooth, literally I caress with the hand: *Lat.*), any medicines which lessen acrimony, or the effects of stimulants on the solids, as gums and other mucilaginous substances.

DEMUR'RAGE (*demoror*, I delay: *Lat.*), in Commerce, an allowance made to the master of a ship by the merchants, for staying in a port longer than the time first appointed.

DEMUR'RER (same *deriv.*), a legal term. Where, on the face of the declaration in an action at law, or a bill filed in chancery, there does not appear sufficient in point of law to entitle the plaintiff to relief, the defendant puts in a demurrer. The effect of this is that the defendant obtains the judgment of the court, whether even, supposing all the allegations in the declaration or bill to be true, the plaintiff has any case against him. If the demurrer be *allowed*, the action or suit is at an end, unless the court permits the pleadings to be amended.

DEM'Y (*demi*, half: *Fr.*), in Heraldry, an epithet for any charge that is borne half: as a demy-lion, or half-lion.——DEMY, the name given by printers to paper when cut or folded into sheets 22 inches long by 17½ broad.——DEMIES, the scholars at Magdalen College, Oxford.

DENA'RIUS (*Lat.*; literally, containing ten), in Roman Antiquity, a silver coin, worth at first ten asses, but afterwards sixteen, when the weight of the ass was reduced to an ounce. In military pay, it was still considered as equal to ten asses. Originally the denarius was the eighty-fourth of a pound of silver, but it was subsequently the ninety-sixth. It is considered to have been worth eightpence-halfpenny English. The gold denarius was equivalent to twenty-five silver ones. Our copper penny has been called a denarius, and is therefore represented by *d.*——DENARIUS DEI, God's penny, or earnest-money given and received by the parties to contracts. It was so called, because in ancient times it was given to the church or to the poor.

DEN'DRACHATE (*dendron*, a tree; and *achatēs*, agate: *Gr.*), in Mineralogy, arborescent agate, or agate containing the figures of shrubs or parts of plants.

DEN'DRITE (*dendritēs*, pertaining to a tree. *Gr.*), a stone or mineral on which are the figures of shrubs or trees. Hence the epithets *dendritic* and *dendroid*.

DEN'DROID (*dendron*, a tree; and *eidos*, form: *Gr.*), a fossil which has some resemblance in form to the branch of a tree.

DENDROL'OGY (*dendron*, a tree, and *logos*, a discourse: *Gr.*), a discourse on, or the natural history of trees.

DENDROM'ETER (*dendron*, a tree; and *metron*, a measure: *Gr.*), an instrument to measure the height and diameter of trees

DEN'IZEN (*dinassdyn*, a man of the city; *Wel.*), an alien who is made a subject by royal letters-patent, holding a middle position between an alien and a natural-born subject. He may take lands by purchase or demise, but cannot enjoy offices of trust, &c., nor receive a grant of lands from the crown

DENOM'INA'TOR (*denomino*, I designate: *Lat.*), in Arithmetic, the number which expresses into how many parts an integer or integers have been divided so as to produce those quantities, some number of which is expressed by the numerator. Thus, in the fraction $\frac{5}{7}$, the integer is supposed to have been divided into seven equal parts, of which five have been taken.

DENOU'EMENT (literally the unknotting: *Fr.*), a word nearly anglicized, signifying the development or winding up of any event.

DEN'SITY (*densitas*: *Lat.*), closeness of constituent parts; that property in bodies by which they contain a certain quantity of matter under a certain bulk or magnitude. It is directly opposed to *rarity*. A body is said to have double and triple the density of another body, when, being equal in size, the quantity of matter in one is double or triple the quantity of matter in the other

DEN'SITY OF THE EARTH Many attempts have been made to ascertain the mean density of our globe, and several processes have been used for this purpose. 1 Maskelyne, in 1774, ascertained the effect of the mountain Schehallien, in Scotland, upon a plumb line, and thus compared the attraction of a known mass with the attraction of the earth. This method has been employed by others. 2. The time of oscillation of a pendulum has been observed at the summit, and at the foot of a mountain. The difference in the times being precisely ascertained, the attraction of the mountain is a matter for calculation. 3 By descending to a known depth into the earth, and comparing the time of oscillation of pendulums stationed there, and on the surface of the earth, data are afforded for calculating the earth's density, because, at the lower station, the attraction of the exterior shell of the earth is got rid of, and the mass of this exterior shell being estimated, a term of comparison is obtained. 4. By ascertaining the attraction of an object of known weight, a piece of lead for example, upon the balance of torsion, as was done in the 'Cavendish experiment.' The results obtained by these several methods have a considerable range, but the mean result is, that our globe has a weight 5½ times greater than a globe of water of the same size. Whence it would seem that the weight of the earth may be estimated at 5,842 trillions of tons.

DEN'TAGRA (*dens*, a tooth; and *ago*, I carry off: *Lat.*), a surgeon's instrument or forceps for extracting teeth.

DEN'TAL (*dens*, a tooth: *Lat.*), an articulation or letter formed by placing the end of the tongue against the upper teeth or nearer the roof of the mouth; as in *d* and *t*.

DENTA'LIUM (same *deriv.*), a genus of marine molluscs, having a tubular slightly curved shell, open at both ends, but much narrower at one end than at the other. It thus has the shape of an elephant's tusk, whence the name.

DEN'TATE (*dentatus*, toothed; from same: *Lat.*) in Natural History, a term usually applied to an edge which is cut into angular projections. *Denticulate* is a diminutive term.

DEN'TIFRICE (*dentifricium*; from *dens*, a tooth; and *frico*, I rub: *Lat.*), any powder or other substance used for cleaning the teeth.

DEN'TIL (*dens*, a tooth: *Lat.*), in Architecture, an ornament in cornices, bearing some resemblance to teeth; used particularly in the Corinthian, Ionic, Composite, and sometimes Doric orders.

DEN'TINE (*dens*, a tooth: *Lat.*), the substance of which the greater part of our teeth consists. It is what is frequently called the ivory of the tooth, and its minute structure is composed of a homogeneous basis surrounding numerous elongated channels, termed the ivory tubes. The dentine of the fangs is covered with the 'cement,' or bony portion; that of the exposed part of the tooth with enamel. [See TEETH]

DEN'TOID (*dens*, a tooth: *Lat.*; and *eidos*, form: *Gr*), having the form of teeth.

DENUDA'TION (*denudo*, I make naked: *Lat*), in Geology, the removal of solid matter from any part of the earth's crust by water in motion, such as rivers, and the waves of the sea. The sea acts upon the margin of the land with a broad horizontal movement, which has a tendency to eat away the land down to its own level. If the land is slowly rising, gentle slopes are found upon it; if it is stationary for a long period, vertical cliffs are produced. Rivers are continually carrying to the sea the weathered particles of rocks, and mud formed by the attrition against each other of stones that have fallen into their bed. The solid materials thus obtained are again spread out over the bottom of the ocean, and thus new strata are formed, which will at some future period be elevated above its level. The stratified deposits in the earth's crust are at once the monument and measure of the denudation which had previously taken place.

DEOB'STRUENT (*de*, privative: and *obstruens*, obstructing: *Lat.*), any medicine which removes obstructions and opens the natural passages for the fluids of the body.

DE'ODAND (*Deo dandum*, to be given to God: *Lat*), a personal chattel which was the immediate occasion of the death of a rational creature, and for that reason was formerly *given to God*, that is, forfeited to the king, to be applied to pious uses. In later times it was given absolutely to the sovereign; but now no chattel is forfeited, however instrumental it may have been in causing death.

DEO'DORIZERS (*de*, privative; and *odor*, a smell: *Lat.*), a term applied to a class of disinfectants especially characterized by their power of destroying fœtid effluvia: among these are chlorine and several of its compounds. A solution of permanganate of potash has lately come into use as a disinfectant. Some kinds of charcoal, and especially that obtained from peat, when mixed with excrement, not only destroy the odour, but form an excellent compost for agricultural purposes.

DEOX'IDATE or **DEOX'IDIZE**, in Chemistry, to deprive of oxygen, or reduce from the state of an oxide.

DEPART'MENT (*Fr.*, from *départir*, to divide), either a division of territory, as the *departments* of France, or a distinct class of official duties allotted to particular persons.

DEPAR'TURE (*départ*: *Fr.*), a nautical term, indicating the distance a ship has gone to the east or west of the meridian from which she set out.

DEPHLOGIS'TICATED AIR (*de*, privative; and *phlogiston*, an element imagined by the older chemists), a term applied by Dr. Priestley, when he first discovered it, to what is now called *oxygen gas*. It was denominated by Scheele, who also discovered it about the same period, *vital air*.

DEPLOY' (*deployer*, to spread: *Fr.*), the spreading of troops; a military term.

DEPO'NENT (*depono*, I lay down; *Lat.*), in Law, one who gives written testimony on oath.

DEPORTA'TION (*deportatio*, from *deporto*, I carry away: *Lat.*), a sort of banishment among the Romans, to some island or other place which was allotted to a criminal for his abode, with an obligation not to leave it on pain of death.

DEPOS'IT (*depositum*, a something intrusted: *Lat.*), among civilians, something that is committed to the custody of a person, to be kept without any reward, and to be returned on demand.

DEPOSI'TION (*depositio*, from *depono*, I lay down: *Lat.*), in Law, the testimony of a witness set down in writing, in answer to interrogations legally made.——DEPOSITION, the settlement of substances suspended in fluids; thus the *depositions* of alluvial matter.——DEPOSITION (*depono*, I take from: *Lat.*), the act of dethroning a king or divesting anyone in authority of his power and dignity.

DEP'OT (*Fr.*), a store or magazine for depositing goods or merchandise.——In Military affairs, a place where all sorts of stores and provisions are kept, and recruits are received and trained. The word is applied, also, to that portion of a regiment which remains at home when the rest is on foreign service.

DEPRES'SION (*depressio*, from *deprimo*, I sink down: *Lat.*), *of the sun, or a star*, in Astronomy, is its distance at any time below the horizon, measured by an arc of the vertical circle.——DEPRESSION OF THE POLE, a phenomenon which arises from the spherical figure of the earth; thus, when a person sails or travels towards the equator, he is said to depress the pole, because as many degrees as he approaches nearer the equator, so many degrees will the pole be nearer the horizon.——DEPRESSION OF AN EQUATION, in Algebra, the reducing an equation to lower degrees by dividing it by some common factor, as a biquadratic to a cubic equation, or a cubic to a quadratic.

DEPRES'SOR (*deprimo*, I press down: *Lat.*), in Anatomy, a name applied to several muscles, because they depress the parts to which they are attached.

DEPRIVA'TION (*de*, from; and *privatio*, a taking away: *Lat.*), the taking away from a clergyman his spiritual dignity by sentence of the proper authority.

DEPURA'TION (*Fr.*), the act of purifying or freeing fluids from heterogeneous matter. This is done either by decantation, when the feculent matter is deposited in the bottom of the vessel, by boiling and skimming, by filtration, or by clarification.

DEP'UTY (*député*: *Fr.*; from *deputo*, I cut off: *Lat.*), in a general sense, a person appointed or elected to act for another, or sent upon some business by a community.——In Law, a *deputy* is one who exercises an office in another's right; and the person whom he represents is answerable for his misconduct. By a *deputation* is generally understood the person or persons authorized and sent to transact business for others, either with a special commission and authority, or with general powers.

DER'ELICTS (*derelictus*, abandoned: *Lat.*), in Civil Law, such goods as are wilfully relinquished by the owner. It also signifies what is forsaken, or cast away by the sea: thus, lands which the sea has suddenly left are called *derelict lands*, and vessels forsaken at sea *derelict ships*.

DERIV'ATIVE (*derivativus*: *Lat.*), in Grammar, any word taking its origin from another, called its *primitive*; as *manhood*, from *man*, &c.

DERMATOL'OGY, or **DERMOL'OGY** (*derma*, a skin; and *logos*, a discourse: *Gr.*), a discourse or treatise on the skin.

DERMES'TES (*dermestēs*: from *derma*, a skin; and *esthio*, I eat: *Gr.*), in Entomology, a genus of coleopterous insects, whose larvæ devour skins, leather, furs, feathers, &c. They are exceedingly destructive in museums and furriers' shops.

DER'VISE or **DER'VIS** (poor: *Pers.*), a name given to various Mahometan priests or monks. Enthusiasts have, from time immemorial, existed in Persia, who, impelled by the convictions that poverty is the only passport to virtue, and that the self-imposed privations of this world will be commensurately rewarded in the next, have voluntarily renounced all the comforts and charities of life. Dervises are found in all Mohammedan countries. There are many sects, distinguished by the different forms and colours of their habit. Dancing is one of their religious ceremonies.

DESCEN'SION (*descensio*, a going down:

Lat.), in Astronomy, an arc of the equator which descends or sets with any sign or point in the zodiac. Descension is either *right* or *oblique*, according as it takes place in a right or oblique sphere.——The epithet *descending* is also in frequent use in Astronomy; as, *descending degrees*, *descending latitude*, &c. And by *descensional difference* is understood the difference between the right and oblique descensions of any planetary body.

DESCENT' (*descensus : Lat.*), in a general sense, is the tendency of a body from a higher to a lower place; thus, all bodies, unless prevented by a force superior to their gravity, descend towards the centre of the earth.——In Law, the title to inherit lands by reason of consanguinity, as well where the heir shall be an ancestor, or collateral relation, as where he shall be a child or other issue. Title to inherit land by descent accrues only when such land is not the subject of a settlement or devise. The principal rules of descent are :—1. That the estate shall lineally to the children of the person who last died entitled. 2. That male children shall take to the exclusion of female. 3 That the eldest male child shall inherit to the exclusion of the other male children; but where there are only female children, they shall all take equally. 4. That the lineal descendants *in infinitum* shall represent, that is, stand in the place of their ancestor, and have the same estate or share that he would have done if living. 5 That when there shall be a failure of lineal descendants, or issue, of the person last entitled (technically called the purchaser), the estate shall ascend and descend to the lineal ancestors, and to the collateral relations of the purchaser 6. That the nearest lineal ancestor shall take the estate in preference to all others: hence, a father will take before a brother, and collaterals only take through a lineal ancestor 7. Amongst collaterals, a relation of the half-blood shall inherit next after any relation in the same degree of the whole blood, and his issue where the common ancestor was a male, and next after the common ancestor where that ancestor was a female. 8 In lineal ascents, and in collateral inheritances, the male stock shall always be preferred to the female, unless the estate has descended from a female. Hence none of the maternal ancestors of the purchaser, nor any of their descendants, can inherit until all the paternal ancestors and their descendants have failed. In some localities, all sons inherit equally from their father, on account of the custom of *gavelkind*. By the custom of *borough English*, the youngest son is heir. Bastards or aliens cannot inherit. But, with certain restrictions, a natural-born subject may derive his title through alien ancestors.——DESCENT, a term in Heraldry, to express coming down; as, 'a lion in descent,' i. e. a lion with his heels upwards, as though in the act of leaping down from an eminence.

DES'ERT (*desertus: Lat.*), a large uninhabited tract of land, or extent of country, entirely barren. In this sense, some are sandy deserts, as those of Arabia, Libya, and Sahara: others are stony, as the desert of Pharan, in Arabia Petræa.

DESER'TER (*desertor : Lat.*), an officer, soldier, or seaman, who quits his post, &c., without leave or intention to return. The crime of desertion has at all times been held in the utmost contempt and abhorrence. Its punishment has ever been severe, and, in time of war, generally that of death.

DESHACHE' (*de*, from; and *hacher*, to hack : *Fr.*), in French Heraldry, a term for a beast whose limbs are separated from its body, but still remain on the escutcheon, and at only a small distance from their natural places.

DESIC'CANT or **DESIC'CATIVE** (*desicco*, I dry up : *Lat.*), any medicine or application that has the property of exhausting moisture from, or drying up, a sore.

DESIDERA'TUM (*Lat.*), a thing to be desired.

DESI'GN (*dessin : Fr.*), in a general sense, the plan, order, representation, or construction of a building, &c., by an outline or general view of it. The word *design*, in painting, is used for the first draft of a large work, which is to be executed and finished in a more elaborate manner.

DESIPIEN'TIA (*Lat.*), in Medicine, a defect of reason, or symptomatic frenzy.

DESMOL'OGY (*desmos*, a ligament; and *logos*, a discourse : *Gr.*), that branch of anatomy which treats of the ligaments and sinews.

DES'POTISM (*despotês*, a master : *Gr.*), a form of government in which the monarch rules by his sole and uncontrolled authority.

DESPOUILLE' (despoiled: *Fr.*), in Heraldry, the whole case, skin, or slough of a beast, with the head, feet, tail, &c., so that, being filled and stuffed, it looks like the entire animal.

DESPUMA'TION (*despumatio*, from *despumo*, I skim off: *Lat.*), a term for clarifying a liquor, by skimming off its froth or excrementitious matter.

DESQUAMA'TION (*desquamo*, I scale off : *Lat.*), in Anatomy, an exfoliation of bone; also the separation of the cuticle in small scales.

DESUDA'TION (*desudatio*, from *desudo*, I sweat much : *Lat.*), in Medicine, a profuse and inordinate sweating, succeeded by an eruption of pustules called *heat-pimples*.

DESULPHURA'TION, in Chemistry, the act or operation of depriving of sulphur.

DETACH'MENT (*Fr.*, from *détacher*, to separate), a body of troops selected or drawn out from several regiments or companies, on some special service or expedition. Also a number of ships, taken from a fleet, and sent on a separate service.

DETENTS' (*detineo*, I keep back : *Lat.*), in Clock-work, those stops which, by being lifted up or let down, lock or unlock the works of a clock in striking.

DETER'GENTS, or **DETER'SIVES** (*detergeo*, I clean out : *Lat.*), medicines which have the power to remove viscid humours, or cleanse sores.

DETERMINA'TION (*determinatio*, from *determino*, I prescribe : *Lat.*), in Physic, the tendency of a body in any particular direction : thus, a determination of blood to the head, liver, &c., is a more copious or rapid flow of blood to those parts.

DETERRA'TION (*de*, from; and *terra*, the earth: *Lat.*), the uncovering of anything buried or hidden in the earth.

DET'INUE (*detineo*, I detain: *Lat.*), in Law, a personal action of contract, that lies against a person who has goods or other things which he detains or refuses to deliver up.

DET'ONA'TING POW'DER. [See FULMINATING POWDER.]

DETONA'TION (*detono*, I thunder: *Lat.*), an explosion or sudden report made by the percussion and inflammation of certain combustible substances.

DETRI'TUS (rubbed down: *Lat.*), in Geology, the fragments removed by natural agencies from the surfaces of rocks.

DEU'TERO-CANON'ICAL (*deuteros*, second; and *kanonikos*, canonical: *Gr.*), in Theology, a term applied to certain books of Scripture which were added to the canon after the rest, either because they were not written till after the canon was compiled, or in consequence of some controversy in regard to their canonicity. A canon was drawn up in the time of Esdras, when some books were put upon it which were not on the canon made before the captivity: thus, Daniel. The apocryphal books, considered as canonical by the Roman Catholic church—Maccabees, for example—were not written until after the Jewish canon was settled.

DEUTERON'OMY (*deuteros*, the second; and *nomos*, law: *Gr.*), one of the sacred books of the Old Testament, or the fifth book of the Pentateuch.

DEUTOX'IDE (*deuteros*, the second: *Gr.*; and oxide), in Chemistry, a substance oxidized in the second degree.

DEVELOP'MENT. In order to become thoroughly acquainted with the nature of an organism, it is necessary to study its life-history, and to trace its development as it passes from the embryonic to the adult condition. Morphology, it has been said, teaches us what an animal is, physiology what it does, the study of development what it was, and how from what it was it came to be what it is. This study is also necessary for the determination of its homologies [see HOMOLOGY], because it is not always safe to infer homology in organs from a correspondence in structure and position. An examination of the organs in their simplest state, and in the stages they pass through, is required to determine the point with perfect certitude. A comparison of the forms of organized beings in past times with one another, and with those now existing, has led some naturalists to conceive that there has been a gradual passage from one form to another, that is, from beings of a lower to those of a higher grade; in other words, that the influence of external circumstances acting through a long lapse of ages upon beings possessing indefinite variability, has changed the earlier less complex forms of life into forms of greater complexity. It is a fact that existing beings of the highest type now pass during their lives from a structure of the greatest simplicity to one of the greatest complexity; and it has been thought that the study of fossil remains proves that the history of organic life, from its first appearance on the planet to the present day, has pursued an analogous course. This is the theory of progressive development.

DEVI'CE (*deviser*, to invent: *Fr.*), in Painting, an emblem or representation of anything, with a motto subjoined, or otherwise introduced.——In Heraldry, a name common to all figures, ciphers, characters, rebuses, mottoes, &c., which, by allusions to the names of persons, families, &c., denote their qualities, nobility, or the like. Badges, impresses, and devices were very commonly used in England from the reign of Edward I. to that of Elizabeth, when they began to be rare.

DEVI'SE (*deviser*, to will: *Fr.*), in Law, is the disposition of real estate by will; being distinguished from a gift of personal estate, which is termed a bequest. The person to whom a devise is made is called a *devisee*.

DEVO'NIAN, or *Old Red Sandstone System*, in Geology, a member of the Palæozoic series. It is divisible into an upper and a lower group. Parts of each are developed in Scotland and the south-west of England. In one of the beds in Scotland, belonging to the upper division, remains of the earliest reptile yet discovered have been found. The Devonian series is interposed between the Silurian and Carboniferous systems.

DEW (*thau*: *Germ.*), the moisture which rises into the atmosphere during the day, and is afterwards deposited on the earth in gentle drops during the night. The air, when heated during the day, is capable of holding a larger quantity of water in solution, as vapour, than when cooled during the night, the low temperature of which causes some of the water to separate. The separated particles uniting, form drops of dew. When the night is cloudy, the surfaces on which the dew would be deposited are not sufficiently cooled down for the purpose, since the clouds give back some of the heat which passed off by radiation.

DEW'-POINT, in Meteorology, that point of temperature at which, if the air is cooled down to it, dew will begin to be formed, the air containing just enough of the vapour of water to saturate it at that temperature.

DEX'TER (*dextra*, the right hand: *Lat.*), the right, or on the right hand or side; as, the *dexter point*, in Heraldry, by which is meant the right-hand side of the escutcheon.

DEX'TRINE, a soluble substance dealt in commercially as British gum, and used in the arts as a substitute for gum. It is obtained from potato starch, by boiling it with an acid. The substance called DIASTASE has also the property of converting starch into dextrine, and at a much lower temperature than that of boiling water. It is simply starch under a new form, having the same chemical composition. The name dextrine was given to it on account of its twisting the plane of polarisation towards the *right* hand.

DEY (*dai*, a maternal uncle: *Turk.*), the title of the supreme governor in Tunis, and the other Barbary states.

DIABE'TES (*Gr.*, from *diabaino*, I stride), in Medicine, a morbid discharge of urine containing sugar.

DIACAUS'TIC CURVE (*diakaio*, I heat to excess: *Gr.*), in the higher Geometry, a curve which touches the rays from a luminous point after they have been refracted by passing through a curved medium.

DIACHRIS'TA (*diachristos*, anointed: *Gr.*), medicines applied to the fauces, palate, &c., for the abstersion of phlegm.

DIACH'YLON (*diachulos*, very juicy: *Gr.*), in Medicine, a plaister formed of the juices of several plants, and formerly very much esteemed. The word is at present used to express a plaister made by boiling hydrated oxide of lead with olive oil.

DIACOUS'TICS (*diakouo*, I hear through: *Gr.*), the refraction of sound, caused by its passing through media of different densities.

DIA'CRISIS (a deciding: *Gr.*), in Medicine, the act of distinguishing diseases from one another by their symptoms.

DIADEL'PHOUS (*dis*, twice: and *adelphos*, a brother: *Gr.*), in Botany, a term given to stamens when their filaments are united into two bundles, as is the case with many leguminous plants. Linnæus formed an order of such plants, and called it *Diadelphia*.

DI'ADEM (*diadēma*, from *diadeo*, I bind round: *Gr.*), anciently a head-band or fillet worn by kings, as a badge of royalty. It was made of silk, thread, or wool, and was put round the temples and forehead, the ends being tied behind, and let fall on the neck. In modern usage, the mark of royalty worn on the head.——DIADEM, in Heraldry, a term applied to certain circles or rims, serving to enclose the crowns of sovereign princes.

DI'ADROM (*diadromē*, a running across; *Gr.*), the time in which the vibration of a pendulum is performed.

DIÆ'RESIS (*diairesis*, a dividing: *Gr.*), in Surgery, an operation serving to divide and separate a part when its continuity is a hindrance to the cure.——DIÆRESIS, in Grammar, the division of one syllable into two, which is usually denoted by two dots over a letter, as in *aulaï* for *aulæ*. Such dots placed over contiguous vowels indicate that they are to be severally pronounced, and not blended into a diphthong.

DIAGNOS'TICS (*diagnostikos*, able to distinguish: *Gr.*), in Medicine, a term applied to those signs which indicate the state of a disease, its nature and cause, the symptoms by which it is known or distinguished from others. When the diagnostics are common to several diseases, they are called *adjunct*; when they always attend a particular disease, the word *pathognomonic* is used.——DIAGNOSTIC SIGNS, in Botany, the signs or characters by which one order is distinguished from others, one genus from others, &c.

DIAG'ONAL (*dia*, through, and *gōnia*, an angle: *Gr.*), in Geometry, a right line drawn across a quadrilateral figure from one angle to another; it is by some called the *diameter* of the figure.

DI'AGRAM (*diagramma*, from *diagrapho*, mark out by lines: *Gr.*), a geometrical delineation, used for the purpose of demonstrating the properties of any figure, as a square, triangle, &c.

DI'AL, or SUN'-DIAL (*dies*, the day, *Lat.*), an instrument for ascertaining the hour of the day by means of the shadow of the sun. It consists of a plane surface, on which lines are drawn in such a manner that the shadow of a wire, or the upper edge of another plane, erected perpendicularly on the former, may show the true time of the day. The projecting body which casts the shadow is called the *style*, or *gnomon*. It must be parallel to the earth's axis, and its plane, when it is a plate of metal instead of a thin rod, must be perpendicular to the terrestrial equator. The style may be made to throw a shadow on a horizontal or other plane; and the dial will be termed *horizontal*, *vertical*, or *inclined*, according to this circumstance. The horizontal dial is the most common: the vertical is the next generally used. The vertical may be turned towards the north, south, &c., and then the dial will be *north*, *south*, &c. If the dial were at right angles to the style, that is, parallel to the plane of the earth's equator, every 15° the shadow travelled round it would be equal to an hour of time, and the angles made by the *hour lines* with each other would be easily found, since they would all be equal. The angles formed by the hour lines of any other dial may, however, be determined without difficulty by means of a good terrestrial globe, or by calculation. In the *polar dial*, which faces due east or due west, and is in the plane of the meridian, the hour lines are parallel.

DI'ALECT (*dialektos*, from *dialego*, I use the language of a particular district: *Gr.*), the form or idiom of a language, peculiar to a province or any particular part of a country. The dialects of Greece are a subject of study to linguists, specimens of several of them having been preserved in the literature. The principal were the Attic, Ionic, Poetic, Æolic, and Doric, which were used either separately or intermixed.

DIALEC'TICS (*dialektikos*, skilled in argument: *Gr.*), that branch of logic which teaches the art of reasoning.

DIAL'LAGE (*diallagē*, an interchange: *Gr.*), a mineral of variable composition, consisting of silica, with lime, magnesia, and other bases. It is usually found of a lamellar or foliated structure. With felspar it forms diallage rock or gabbro.

DI'ALLING SPHERE, an instrument made of brass, with several semicircles sliding over each other upon a movable horizon; serving to show the nature of spherical triangles, and to give a correct method of drawing dials on all sorts of planes.

DIAL'OGISM (*dialogismos*, a conversation: *Gr.*), in Rhetoric, the soliloquy of persons deliberating with themselves. It is also, in a more extensive sense, taken for discourse in general, whether held by a person alone, or in company with others.

DI'ALOGUE (*dialogos*, from *dialegomai*, I converse with: *Gr.*), a verbal or written discourse between two or more persons.

DIAL'YSIS (*dialusis*, from *dialuo*, I part asunder: *Gr.*), a mark or character, consisting of two points, placed over one of two vowels, as *mosaic*, to separate the parts of the diphthong, and show that they must be sounded distinctly. [See DIÆRESIS.]——In Rhetoric, a figure of speech in which several words are placed together without the aid of a conjunction, as *veni, vidi, vici.*——In Medicine, a term denoting great relaxation or weakness of the limbs.——In Physics, it has been found that substances in a state of solution pass through a membrane with different degrees of rapidity according to their nature. Thus, if a mixture of a solution of gum arabic, and a solution of common salt, be placed upon a stretched sheet of parchment, the saline solution will pass through sooner than the gum. With reference to this property, Prof. Graham has divided all soluble substances into *colloids* (*colla*, glue: *Gr.*), and *haloids* (*hals*, salt: *Gr.*). This discovery has been turned to practical account in the separation of the constituents of mixtures of the two classes of substances.

DIAMAGNET'IC (*dia*, through: *Gr.*), an epithet applied to bodies which are repelled by the poles of a magnet, and which, when freely suspended between the poles of a magnetic, will arrange themselves, if of an elongated form, across the lines of force. *Paramagnetic* (*para*, with: *Gr.*) bodies are the reverse of these, and set themselves along, not across, the lines of magnetic force.

DIAM'ETER (*diametros*, from *diametreo*, I measure through: *Gr.*), in Geometry, a right line passing through the centre of a circle or other curvilinear figure, and terminated at each extremity by the circumference. It thus divides the circle into two equal parts, and is the greatest chord; hence we have a method of describing a semicircle upon any line, by assuming its middle point for the centre. The diameter of a circle is to the circumference as 1 to 3·1416, or as 7 to 22 nearly. The square of the diameter multiplied by ·7854 is the area. The cube of the diameter of a sphere multiplied by ·5236, gives the solid contents.

DI'AMOND (a corruption of *adamant*, from *adamas*: *a*, not; and *damao*, I subdue – on account of its hardness: *Gr.*), the most valuable and the hardest of gems. When pure, it is perfectly clear and pellucid, and is eminently distinguished from all other substances by its vivid splendour and the brightness of its reflections. Though found of different shapes, and sometimes tinged with several colours, yet it ever bears the same distinguishing characters. The largest diamond ever known is probably that of the rajah of Mattan, in the East Indies. It is of the purest water, weighs 367 carats, or, at the rate of 4 grains to the carat, upwards of 3 ounces troy. It is shaped like an egg. A governor of Batavia offered 150,000 dollars, two ships of war with their ammunition and guns, and a certain number of great guns, with powder and shot, for it. But the rajah refused to part with it at any price. The Mogul diamond, under the name of *Koh-i-noor* (mountain of light), is in the possession of the queen of England. Its history is supposed to reach back about 4000 years. It has been recently re-cut, and now weighs $186\frac{1}{16}$ carats. A diamond belonging to the emperor of Russia weighs 193 carats: it is of the size of a pigeon's egg. The Regent or Pitt diamond, in the possession of the French government, weighs 136 carats; and one belonging to the court of Portugal 120 carats. The value of a wrought diamond is found by ascertaining its weight in carats, doubling it, squaring the result, and multiplying what is obtained into 2*l.* Thus, if a diamond weighs 5 carats: twice 5 are ten, ten times 10 are 100, 100 times 2*l.* are 200*l.* This rule does not hold when the diamond becomes large, on account of the fewness of purchasers. A very trifling flaw greatly lowers the commercial value of a diamond. The places whence diamonds are brought are Borneo and Golconda, Bengal, and the Brazils. In the last-mentioned country the gem appears to have been originally found in the metamorphic quartzo-schistose rock, constituting the mountains of the Diamond district in southern Brazil. It, is, however, almost invariably obtained by washing from a loose gravel, formed by the disintegration of the metamorphic rock, or from a conglomerate chiefly composed of gravel set in a ferruginous cement. These gems consist of pure carbon, and, as the hardest tools make no impression on them, they are cut and ground by the powder of their own substance. In the experiments of modern chemists, the diamond has been reduced to carbonic acid by combustion with oxygen, and, like carbon, it is capable of changing iron into steel. Diamonds are valuable for many purposes. Their powder is the best for the lapidary and gem engraver, and more economical than any other material for cutting, engraving, and polishing hard stones. Glaziers use them, set in a steel socket, and attached to a small wooden handle, for cutting glass. It is very remarkable, that only the point of a natural crystal can be used; cut or split diamonds scratch, but the glass will not break along the scratch, as it does when a natural crystal is used. The diamond has also of late years become an article of great value to engravers, particularly in drawing or ruling lines, which are afterwards to be deepened by aqua fortis, for which steel points, called etching needles, were formerly used.——ROUGH DIAMOND, the stone as it comes from the mines.——ROSE DIAMOND, one which is quite flat underneath, with its upper part cut in numerous little faces, usually triangles, the uppermost of which terminate in a point.——TABLE DIAMOND, one which has a large square face at top, encompassed with four smaller.——BRILLIANT DIAMOND, one which is cut in faces both at top and bottom, and whose table or principal face is flat. In cutting diamonds the first step is to cement them at the ends of two pieces of wood, which are held in the hands and rubbed together. The dust thus produced is carefully preserved for the purpose of polishing. The diamond is then embedded in soft metal, and in this state is brought to bear at the proper angle upon a horizontal plate of soft iron, called a skieve.

set in rapid revolution, the plate having been first charged with diamond dust mixed with oil. Each facet is thus separately formed and polished.

DI'AMOND BEET'LE, a coleopterous insect, a member of the family *Curculionidæ*. The *elytra*, or wing cases, are very brilliant, and fragments are often mounted for examination by the microscope.

DIA'NA, TREE OF (*Dianæ arbor: Lat.*), a name given by the old chemists to the crystallized silver which forms when mercury is put into a solution of nitrate of silver.

DIAN'DRIA (*dis*, twice; and *anēr*, a male: *Gr.*), the second class of the Linnæan system of plants, containing those which have two stamens.

DIANŒ'A (*dianoia*, a thought: *Gr.*), in Rhetoric, a figure of speech, importing a serious consideration of the matter in hand.

DIAN'THUS (*dianthēs*, variegated; literally, flowering twice: *Gr.*), in Botany, a genus of plants, nat. ord. *Silenaceæ*, including the various species of pink and carnation.

DIAPA'SON (*Lat.*: from *dia*, through; and *pasōn*, all: *Gr.*—that is, through all the notes of the octave: a concord consisting of a note and its octave), in Music, an interval, which most authors who have written upon the theory of music use to express the octave of the Greeks. The diapason is the first and most perfect of the concords: if considered simply, it is but one harmonical interval; though, if considered diatonically, by tones and semitones, it contains seven degrees.——**Diapason**, the fundamental or standard scale by which musical instruments are made.——**Diapason Stop**, that which indicates the power of an organ, by the length of its longest pipe; as of 8, 16, or 32 feet.

DIAPEN'TE (*dia*, through; and *pente*, five: *Gr.*, a concord consisting of a note and its fifth), in Music, an ancient term signifying a fifth; an interval making the second of the concords.——In Medicine, a composition of five ingredients.

DI'APER (*d'Ypres: Fr.*, from being originally made at Ypres), a kind of figured linen cloth, much used for towels and napkins.

DIAPH'ANOUS (*diaphanēs*, from *diaphaino*, I let a thing be seen through: *Gr.*), an appellation given to all transparent bodies, or such as transmit the rays of light. It is synonymous with *translucent*, but differs from *transparent*, since it does not allow the *forms* of objects to be seen.

DIAPH'ORA (a difference: *Gr.*), in Rhetoric, a figure of speech, in which a word, when repeated, is taken in a different sense from that in which it was first used.

DIAPHORE'SIS (*Gr.*, from *diaphoreo*, I carry off), in Medicine, augmented perspiration.

DIAPHORE'TICS (*diaphorētikos*, from same: *Gr.*), medicines which promote perspiration.

DI'APHRAGM (*diaphragma*, literally a partition wall: *Gr.*), in Anatomy, a large muscular membrane or skin placed transversely in the trunk, and dividing the thorax or chest from the abdomen.

DIAPOR'ESIS (perplexity: *Gr.*), in Rhetoric, a figure expressive of the speaker's doubt or hesitation as to the manner in which he should proceed in his discourse, the subjects he has to treat of being all equally important.

DIARRHŒ'A (*diarrheo*, I flow through: *Gr.*), a disorder which consists in a frequent and copious evacuation from the intestines.

DIARTHRO'SIS (a separation: *Gr.*), in Anatomy, a kind of juncture of the bones, in which there is a perceptible motion.

DI'ARY (*dies*, a day: *Lat.*), a register of daily occurrences and observations; or an account of what passes in the course of a day.

DI'ASPORE (*diaspora*, a scattering: *Gr.*), a laminated mineral, consisting of alumina, water, and oxide of iron. A small fragment decrepitates when heated, and is dispersed in numerous particles; whence the name.

DI'ASTASE (*diastasis*, a separation: *Gr.*), a peculiar azotised substance, formed in barley and other grains during germination from the gluten or vegetable albuminous matter. This substance has the effect of converting starch into dextrine, and ultimately into grape sugar. It is precipitated from an infusion of bruised malt by alcohol. When malt is mashed with raw grain, its diastase changes the starch of the grain into sugar.

DIAS'TASIS (a separation: *Gr.*), a term used by ancient Physicians for a distension of the muscles, or separation of the bones.

DIASTE'MA (*diastēma*, an interval: *Gr.*), in Rhetoric, a modulation of the tones of the voice, by marking with precision the intervals between its elevation and depression.——In *Music*, a space or interval.

DIAS'TOLE (*Gr.*), among Physicians, a dilatation of the heart, auricles, and arteries, during the process of circulation: it is opposed to *systole*, a contraction of the same parts.——In Grammar, a figure of prosody, by which a syllable naturally short is made long.

DI'ASTYLE (*diastulos*: from *dia*, asunder; and *stulos*, a column: *Gr.*), an edifice in which three diameters of a column are allowed for the intercolumniations.

DIASYR'MUS (*diasurmos*, a mocking: *Gr.*), in Rhetoric, a kind of hyperbole, being an exaggeration of something low and ridiculous; ironical praise.

DIATES'SARON (*diatessarōn*: from *dia*, through; and *tessarōn*, four: *Gr.*: a concord consisting of a note and its fourth), in Music, a concord or harmonic interval, composed of a major tone, a minor tone, and one major semitone.——In Theology, the four gospels.

DIATHER'MANOUS (*dia*, through; *thermos*, hot: *Gr.*), a term applied to those substances which transmit radiant heat. Substances do this in different degrees, and some refuse to transmit any. Thus, glass, through which light passes readily, is opaque to heat; whilst rock-salt, through which light will not penetrate, permits heat to pass.

DIATOMA'CEÆ (*dia*, through; *tomos*, a section: *Gr.*), a large tribe of microscopic vegetables, growing in salt and fresh water, and usually parasitic upon other vegetables. They were formerly confused with animal infusoria, but are now universally considered vegetable organisms, notwithstanding the curious motions which some species exhibit. They form a division of the great order of Algæ. Some of the species are solitary, whilst others are grouped into lines and membranes. In consequence of the variety of their shapes, and of a large portion of each individual consisting of silex forming a hollow case bearing elegant patterns made by striæ, they have been sought after by microscopists, and they have been extensively studied. They retain their beautiful configuration even after boiling in strong acid, a process adopted in preparing them for inspection, in order to get rid of the vegetable matter. These silicious cases are found fossil in enormous quantities in various parts of the world.

DIATON'IC (*diatonos*: from *dia*, through; and *tonos*, a tone: *Gr.*), in Music, whatever proceeds by tones and semitones, both ascending and descending. Thus we say, a *diatonic* series; a *diatonic* interval; *diatonic* melody or harmony.

DI'CAST (*dikastēs*, from *dikē*, justice: *Gr.*), in Ancient Greece, an officer answering nearly to our juryman.

DICE (*dés*: *Fr.*), cubical pieces of bone or ivory with dots on their faces ranging from one to six. They are employed in various games, and are of great antiquity. One tradition says that they were invented by Palamedes, at the siege of Troy, for the amusement of the officers and soldiers.

DICHOT'OMOUS (*dichotomos*, divided equally into two: *Gr.*), in Botany, an epithet for a stem or branch that divides and redivides into two throughout.

DICHOT'OMY (*dichotomia*: from *dicha*, in two; and *temno*, I cut: *Gr.*), in Astronomy, that phase or appearance of the moon, when she is bisected, or shows just half her disk. In this situation the moon is said to be in her quadrature.

DICHRO'MATISM, or DICHRO'ISM (*dis*, double; and *chrōma*, a colour: *Gr.*), a property, in certain crystallized bodies, of exhibiting two distinct colours, according to the direction in which the light is transmitted through them. Dichromatism is also exhibited by certain liquid solutions. For instance, if a few drops of cochineal be mixed with water in a tall champagne glass, the upper part will be red, the lower of a lavender tint. Again, a strong solution of acetate of chromium is red, but if diluted with water it becomes green.

DICLI'NAL, or DICLI'NOUS (*dis*, twice; *kline*, a bed: *Gr.*), in Botany, an epithet for plants which have the stamens and pistils in distinct flowers.

DICOTYLE'DONOUS (*dis*, double: *Gr.*; and *cotyledon*), in Botany, an epithet applied to plants which have an embryo or germ with two seed-lobes or COTYLEDONS. Almost all exogenous plants are dicotyledonous, whilst endogenous plants are monocotyledonous, that is, with only a single seed-lobe attached to the embryo.

DICTA'TOR (*Lat.*, from *dicto*, I order), in Ancient Rome, a magistrate created in times of exigency and distress, and invested with very great power. He had authority to raise or disband troops, and to make war or peace, and that without the consent of either the senate or the people. The usual duration of his office was only for six months, during which time all the ordinary magistrates, except the tribunes of the people, acted under his authority. Whenever he appeared in public, he was attended by twenty-four lictors, or double the number allowed a consul. Extensive, however, as his power was, he was nevertheless under some restrictions: he could not, for instance, spend the public money arbitrarily, leave Italy, or enter the city on horseback. The choice of a dictator was not, as in the case of other magistrates, decided by the popular voice, but one of the consuls appointed him by command of the senate; and the dictator always nominated his *master of the horse*, unless that officer had been named by the senate. A dictator was also sometimes named for holding the *comitia* for the election of consuls, and for the celebration of public games, &c. For the space of four hundred years this office was regarded with veneration, till Sylla and Cæsar, by becoming perpetual dictators, converted it into an engine of tyranny, and rendered the very name odious.

DIC'TIONARY (*dictionarium*: *Mod. Lat.*; from *dictio*, a word or expression: *Lat.*), in its first and most obvious sense, signifies a vocabulary, or alphabetical arrangement of the words in a language, with their definitions. But, now that the various branches of science have become so much extended, the term is also applied to an alphabetical collection of the terms of any art or science, with such explanations or remarks as the writer may deem necessary for their elucidation.

DIDAC'TIC PO'ETRY (*didaktikos*, instructive, from *didasko*, I teach: *Gr.*), that species of metrical composition which has *instruction* for its primary object. But though its ostensible aim is to impart instruction in verse, it may and often does attain an animated and elevated character.

DIDAC'TYLOUS (*dis*, double; and *daktulos*, a finger: *Gr.*), in Zoology, an epithet for having two fingers or toes.

DIDECAHE'DRAL (*dis*, twice; *deka*, ten; and *hedra*, a base: *Gr.*), in Crystallography, having the form of a decahedral (or ten-sided) prism, with pentahedral (or five-sided) summits.

DIDODECAHE'DRAL (*dis*, twice; *dōdeka*, twelve; and *hedra*, a base: *Gr.*), in Crystallography, having the form of a dodecahedral (twelve-sided) prism, with hexahedral (six-sided) summits.

DIDYNA'MOUS (*dis*, double: and *dunamis*, power: *Gr.*), in Botany, an epithet for flowers which have two of their stamens longer than the other two, as amongst the *Labiatæ*. Linnæus formed such flowers into a class which he named *Didynamia*.

DIE (*dé*: *Fr.*), the stamp with which a piece of prepared metal is impressed in coining, &c. Coins are generally completed by one blow of the coining-press; and at the Royal Mint these presses are so contrived, as to strike, upon an average, sixty blows in a minute Medals are usually in very high relief, and the effect is produced by a succession of blows.

DI'ES (a day: *Lat.*). In Law, days are distinguished into *Dies juridici*, days on which the court sits for the administration of justice; *Dies non* (juridici), days on which no pleas are held in any court of justice; and *Dies datus*, a day, or time of respite, given by the court to the defendant in a cause.——Among the Romans, days were distinguished in a variety of ways; the most important of which were *Dies nefasti* or *Dies atri*, days devoted to religious purposes, on which it was unlawful to do any public business *Dies fasti*, similar to the *Dies juridici* of modern times; and *Dies feriati*, like our *Dies non juridici*, when the courts were shut.——DIES CANICULARES, in Astronomy, the *dog days*.——DIES CRITICI, in Medicine, days in which some diseases are supposed to arrive at a crisis

DIE'SIS (*Gr*: the least subdivision in music), that division of a tone less than a semitone; or an interval consisting of a less or imperfect semitone.

DI'ET (*diaita*, maintenance: *Gr*), food regulated by the rules of medicine The best way to preserve health is to live upon plain simple food, lightly seasoned, and in a quantity agreeable to the age, strength of the stomach, sex, and constitution. Generally, indeed, hunger shows the best time of eating, as thirst does of drinking; but if either be indulged to excess, our health and spirits will both suffer In summer, when the fluid parts quickly evaporate, the diet should be moist, cooling and easy of digestion, to repair the loss with the greater speed: but in winter, the stomach will admit of more solid and heating aliments. The golden rule, however, seems to be, to use moderation both in eating and drinking; and it is indisputable that early habits of self-command, in the regulation of the appetite, are of paramount importance to all who would enjoy good health, and attain a vigorous old age.——DIET (*Diät* · *Germ.*), in German politics, a convention of princes, electors, ecclesiastical dignitaries, and representatives of free cities, to deliberate on the affairs of the empire.

DIETET'ICS (*diaitētikos*, relating to diet: *Gr.*), the rules relating to diet framed with a view to healthy persons and to invalids.

DIEU ET SON ACTE (God and his act: *Fr.*), a maxim in old law, that the act of God shall not be a prejudice to any man.

DIEU ET MON DROIT (God and my right: *Fr.*), the motto of the royal arms of England, first assumed by king Richard I. to intimate that he did not hold his empire in vassalage to any mortal It was afterwards assumed by Edward III., and was continued without interruption to the time of William III., who used the motto *je maintiendray*, though the former was still retained upon the great seal. After him queen Anne adopted the motto *semper eadem*, which had been before used by queen Elizabeth; but since Anne's time, *Dieu et mon droit* has been the royal motto.

DIF'FERENCE (*differentia Lat.*), in Logic, an essential attribute belonging to any species that is not found in the genus; being the formal or distinguishing part of the essence of a species.——In Arithmetic, the remainder, when one number has been subtracted from another.——DIFFERENCES, in Heraldry, certain additions to a coat of arms, serving to distinguish one family from another, or a younger branch from the elder or principal branch. The eldest son bears a *label of three points*; the second, a *crescent*; the third, a *mullet*; the fourth, a *martlet*; the fifth, an *annulet*, or small ring; the sixth, a *fleur de lis*; the seventh, a *rose*; the eighth, a *cross moline*; the ninth, a *double quatrefoil*. The family of the second son repeat these differences on their own paternal mark of filiation:—thus, the second son's first son bears a crescent ensigned with a label; and so on of the rest. Females do not bear differences.

DIFFEREN'TIAL CAL'CULUS, a most important branch of the higher mathematics, invented by Leibnitz, and brought to perfection by James and John Bernoulli. The method of fluxions, which is the same as the calculus, except as to notation and the mode of explaining the principles, was discovered some years before by Newton. The object of the calculus is to find the ratios of the differences of variable magnitudes, on the supposition that these differences become infinitely small. Every magnitude which forms the subject of mathematical reasoning may be increased or diminished without limit. We may therefore always conceive a quantity to become so great as to exceed, or so small as to be less than, any assignable finite quantity of the same nature as itself. It is not necessary to attribute a physical existence to either of them The infinitely small quantities, which are considered in the differential calculus, are called *differentials* The differential of a variable quantity is 'the infinitely small difference between two successive states of the same variable;' and the object of the *calculus* is to find this for all possible cases.

DIF'FORM (*dis*, signifying separation; and *forma*, a form: *Lat.*), in Botany, an epithet for leaves or flowers which do not correspond in size or proportion: the opposite of *uniform*.

DIF'FRACTION OF LIGHT When a beam of light, admitted into a dark chamber, is received on a screen, and a small object is placed in its path, there will be seen a number of coloured fringes external to the shadow, and if the object be a narrow one, like a piece of thin wire, there will also be fringes of colour in the shadow, whilst the middle will be luminous, as if the object were perforated. This phenomenon is called diffraction, and it arises from the interference of the undulations of light, passing on opposite sides of the object which throws the shadow.

DIF'FUSION OF GASES. Two gases, not acting chemically on each other, will intermix, if allowed to do so, even against the action of gravity. Thus if a vessel be separated into two divisions by a partition of dry plaster of Paris, and one division filled with oxygen, the other with hydrogen, the heavier oxygen will penetrate upwards, and the lighter hydrogen downwards, through the porous partition, until the two are uniformly mixed. Hence we see how in the economy of nature the atmosphere is preserved in a uniform state, as regards the proportions of its constituent gases, and the accumulation of deleterious vapours in towns is prevented.

DI'GAMMA, an ancient letter of the Greeks which is thought to have been equivalent to our W. It was finally dropped from the alphabet. It has given rise to much learned dissertation.

DI'GEST (*digestus*, a distributing: *Lat.*), in Law Literature, a collection of judicial decisions arranged under distinct heads. The most celebrated *digest* was that made by order of the emperor Justinian, which was published A.D. 533. This was the spirit of several thousand volumes containing judicial decisions and the opinions of the most learned jurisconsults. It was divided into 50 books, and was termed *Digesta* or *Pandectæ*.

DIGES'TER (*digesteur: Fr.*), a strong metallic vessel, with a tight lid and a safety valve, for subjecting bodies to the action of high-pressure steam.

DIGES'TION (*digestio: Lat.*), that process by which the nutritive portion of food is elaborated and prepared to be converted into blood. This is effected in the stomach and the intestines. The stomach is lined with glands, one set of which secrete a solvent fluid called the gastric juice, and another set secrete an albuminous fluid. When the food has become reduced to a pulpy fluid called *chyme*, it is passed into the duodenum, the first portion of the small intestine, where the bile secreted by the liver and the pancreatic juice secreted by the pancreas are mingled with the aliment, and it there becomes completely elaborated, the nutritious being separated from the rejected portion. The milky liquid called *chyle* is the result, and this is carried into the blood by certain very minute vessels, called lymphatics or lacteals, which are numerously distributed in the walls of the intestine, and are in communication with the veins. The residue of the product of digestion is carried on to the great intestine, and is afterwards ejected. In the lower animals the process is much less complicated than amongst the vertebrata. In many it does not advance beyond the making of chyme, which is circulated through the body without further elaboration.——DIGESTION, in Chemistry, the exposing of bodies to the action of moderately warm water.

DIGES'TIVE (*digestio*, a digesting: *Lat.*), in Medicine, any preparation which increases the energy of the stomach, and aids digestion.——In Surgery, an application which ripens an ulcer or wound, or disposes it to suppurate.

DI'GIT (*digitus*, a finger: *Lat.*), in Astronomy, the twelfth part of the diameter of the sun or moon: a term used to express the quantity and magnitude of an eclipse. Thus, an eclipse is said to be of six digits when six of these parts are hid.——Also, a measure taken from the breadth of the finger, and thus indicating the humble means originally employed in measurements, &c. It is properly three-quarters of an inch.——DIGITS, or MONADES, in Arithmetic, any one of the nine numerals, 1, 2, 3, 4, 5, 6, 7, 8, 9.

DIGITA'LIS (*Lat.*, literally pertaining to the finger, from its five-parted leafy calyx), in Botany, a genus of plants, containing the common foxglove, *D. purpurea*, and belonging to the nat. ord. *Scrophulariaceæ*. In this and some other species, there is a principle which, in a concentrated form, is poisonous. An extract is much employed to lower the action of the heart.

DI'GITATE (*digitatus*, having fingers: *Lat.*), in Botany, an epithet used when a leaf branches into several distinct leaflets like fingers; or when a simple undivided petiole connects several leaflets at the end of it.

DI'GLYPH (*digluphos*: from *dis*, twice; and *glupho*, I hollow out: *Gr.*), in Architecture, a kind of imperfect triglyph, with *two* instead of *three* channels.

DIG'NITARY (*dignitas*, a dignity: *Lat.*), in the Canon Law, an ecclesiastic who holds a dignity which gives him some pre-eminence over mere priests and canons; as a bishop, dean, archdeacon, prebendary, &c.

DI'GRAPH (*dis*, double; and *graphē*, a letter: *Gr.*), a union of two vowels, of which one only is pronounced, as in *bread*. It is essentially different from a diphthong, which consists of two vowels also, but produces a sound which neither of the vowels has separately.

DIGRES'SION (*digressio*, a going aside: *Lat.*), in Rhetoric or Literary Composition, that passage or narration which deviates from the main subject, but which has some relation to it, or may be useful by way of illustration.

DIGYN'IA (*dis*, twice; and *gunē*, a female: *Gr.*), in Botany, an order in the Linnæan system, consisting of plants that have two pistils.

DIHEXAHE'DRAL (*dis*, twice; *hex*, six; and *hedra*, a base: *Gr.*), in Crystallography, having the form of a hexahedral (six-sided) prism with trihedral (three-sided) summits.

DIKE, or DYKE (*dique: Fr.*), a mound of earth, stones, or other materials, intended to prevent low land from being inundated by the sea, &c., as the dikes of Holland.——In Geology, sheets of igneous rock, which have usually a vertical or oblique position. They have originated from the filling up of a fissure by molten rock. When the rocks at each side have disappeared through denudation, the dike is seen to stand out like a wall; whence its name.

DILAPIDA'TION (*dilapidatio*, from *dilapido*, I demolish: *Lat.*), in Law, the ruin or damage which accrues to a house in consequence of neglect.

DILATA'TION (*dilatatio*, from *dilato*, I make wide: *Lat.*), in Surgery and Anatomy, the widening the orifice of a wound, or the distension of a vessel.

DILEM'MA (*dilemma:* from *dis*, twice; and *lambano*, I take: *Gr.*), in Logic, an argument which is usually defined as a complex kind of conditional syllogism. It has commonly two divisions, which places an opponent in such a position that he cannot escape from one of two difficulties, both fatal to his own side. If he avoids the rocks, he is drawn into the whirlpool. It is sometimes called a *syllogismus cornutus*, or horned syllogism, the adversary being gored by one or other horn. When Demosthenes argued against Æschines, 'If he joined in the public rejoicings he is inconsistent; if he did not he is unpatriotic; therefore he is either inconsistent or unpatriotic,' he urged a dilemma against his opponent.

DILETTAN'TE (*Ital.*), an amateur of the fine arts.

DILETTAN'TI SOCIETY, a society established in London in 1734, and still existing, for the purpose of promoting the study of the fine arts. It has chiefly devoted itself to ancient sculpture, and has been at the expense of bringing some specimens to this country, and of publishing several volumes of illustrations, inscriptions, and travels. The society meets at the Thatched House Tavern in St. James's Street, London, where there is a collection of portraits of several eminent members, and two conversation pieces by Sir Joshua Reynolds.

DILU'VIUM (a deluge: *Lat.*), an old geological term given to boulders and superficial accumulations of gravel, sand, and mud, which were formerly attributed to the deluge of Scripture. The phenomena in question are now considered to have been produced by the action of ice.

DIMEN'SION (*dimensio*, a measuring: *Lat.*), the measure or compass of a thing. A line has one dimension, namely, length; a superficies two, length and breadth; and a solid three, length, breadth, and thickness. The word is generally used in the plural, and then denotes the whole space occupied by a body, or its size and capacity; as the *dimensions* of a room, ship, &c.

DIMINUEN'DO (*Ital.*), a term in Music of the same meaning as *decrescendo*, which see.

DIMINU'TION (*diminutio*, a lessening: *Lat.*), in Architecture, a contraction of the upper part of a column, by which its diameter is made less than that of the lower part. It generally commences from one-third of the height of the column.——**Diminution**, in Rhetoric, the exaggerating what is said, by an expression that seems to diminish it.——In Music, the imitation of or reply to a subject, in notes of half the length or value of those of the subject itself.

DIMIN'UTIVE (*diminutus*, lessened: *Lat.*), in Grammar, a word which, by means of some termination, attaches littleness to the idea contained in the original word; as, *rivulet*, a small river; *mannikin*, a little man.

DIM'ISSORY (*dimissus*, sent away: *Lat.*), dismissing to another jurisdiction.——A **Letter Dimissory** is one given by a bishop to a candidate for holy orders, having a title in his diocese, directed to some other bishop, and giving leave for the bearer to be ordained by him.

DIM'ITY, a kind of white cotton cloth, ribbed or figured. It was originally imported from India, but is now manufactured in Lancashire and various other parts of Britain.

DIOC'ESAN (*dioikesis*, a government: *Gr.*), a bishop who has charge of a particular diocese.

DI'OCESE or **DI'OCESS** (same *deriv.*), the district or circuit of a bishop's jurisdiction. The word was first used in the fourth century, when the exterior polity of the church began to be formed upon the model of the Roman empire. England, in regard to its ecclesiastical state, is divided into two provinces, viz., Canterbury and York, and each province into subordinate dioceses; the province of Canterbury contains twenty-one dioceses, and that of York three. These are divided into archdeaconries, which are subdivided into rural deaneries and parishes.

DIOCTAHE'DRIA (*dis*, twice; *octō*, eight; and *hedra*, a base: *Gr.*), in Crystallography, crystals composed of two octangular pyramids, joined base to base, without any intermediate column.

DI'ODON (*dis*, twice; and *odous*, a tooth: *Gr.*), in Ichthyology, a genus of fishes, each of whose jaws is a single and continuous dental plate. Like the Tetrodons, they have the power of inflating their bodies with air until they become globular. Their skins are frequently set with spines. They are dangerous fishes to use as food.

DIŒ'CIOUS (*dis*, double; and *oikos*, a house: *Gr.*), a term applied by botanists to those species of plants which have the staminiferous flowers on one individual, and the pistilliferous flowers on another. *Monœcious* species (*monos*, single; and *oikos*, a house: *Gr.*), are those which have also unisexual or diclinous flowers, but they are found upon the same individual. Linnæus formed two orders, *Monœcia* and *Diœcia*, for the reception of such plants.

DIOME'DEA. [See Albatross.]

DIOP'SIDE (*diopsis*, a view through anything: *Gr.*), a rare mineral, of a pale green colour, occurring in prismatic crystals, and regarded as a variety of *Augite*.

DIOP'TRICS (*dioptron*, anything through which an object is seen: *Gr.*), that branch of Optics which has reference to the light which enters and passes through transparent bodies. The phenomena of refraction, including the changes of direction which rays of light undergo in passing through prisms and lenses, fall into the department of dioptrics; and many optical instruments, such as the telescope, the microscope, the spectroscope, and the stereoscope, have been constructed according to the laws discovered by the study of this branch of optics.

DIORA'MA (*diorao*, I see through: *Gr.*), a mode of painting invented by two French artists, Daguerre and Bouton. It produces a very high degree of optical delusion, by the application of two principles. First, the spectators and the picture are placed in two different rooms, and the picture is viewed through an aperture, the sides of which are continued towards the picture, so as to prevent any object in the picture-room, except the picture itself, being seen. The only light which enters the eye is from the picture, and the latter is illuminated by a method which allows the light thrown on it to be varied, as to intensity, tint, &c, according to every difference of circumstances. Secondly, certain parts of the picture are in transparency: this allows a stream of light to be thrown from behind, which, passing through the picture, produces an extraordinary brilliancy, and a relief of the objects which is exceedingly strong and deceptive.

DIOSCO'REA. [See YAM.]

DIOS'PYROS (*dios*, celestial; and *puros*, food: *Gr.*), in Botany, a genus of trees growing in Asia, Africa, and America, nat. ord, *Ebenaceæ*, and bearing a plum-like edible fruit.

DIP, the angle made by a magnetic needle, freely suspended at its middle, with the horizontal plane at any given place on the earth's surface.——DIP, in Geology, the inclination of a stratum of rock; its amount is measured by the angle it makes with the horizontal plane. *Strike* is the direction of the stratum at right angles to the dip. The ridge of a house roof represents the strike, whilst the sloping slates represent the dip.

DIPET'ALOUS (*dis*, double: and *petalon*, a leaf: *Gr.*), in Botany, an epithet for a corolla having two petals only.

DIPHTHE'RIA (*diphthera*, parchment: *Gr.*), a peculiar condition of the mucous membrane, when, instead of secreting pus, as in the case of ordinary inflammation, lymph is poured out in large quantities, and a thick false membrane is formed over the surface. The term has been commonly applied to the disease when it attacks the mucous membrane of the throat, but it is now extended to a similar condition of the membrane lining the eyelids (*diphtheria* of the *conjunctiva*). Diphtheria of the throat is often associated with very severe constitutional symptoms.

DIPH'THONG (*diphthongos*: from *dis*, double; and *phthongos*, a voice: *Gr.*), the union of two vowels pronounced in one syllable, as *noise*, *bound*, *joint*, &c. [See DIGRAPH.]

DIPH'YLLOUS (*dis*, double; and *phullon*, a leaf: *Gr.*), in Botany, an epithet for a calyx, &c., having two leaves.

DIP'LOE (*Gr.*, from *diploo*, I double), in Anatomy, the horny or spongy substance between the tables of the skull.

DIPLO'MA (*Gr.*, from same), a written document, conferring some power, privilege, or honour. Thus an instrument or licence, given by colleges, societies, &c. to a clergyman to exercise the ministerial function; or to a physician to practise his profession, after passing examination, or being admitted to a degree. Every kind of ancient charter, donation, bull, &c., is comprehended by writers on diplomatics under this name, from the charters of the Roman emperors having been inscribed on two tablets of copper joined together so as to fold like a book.

DIPLO'MACY (from last). In its most extended signification, it embraces the whole system of negotiation with foreign states, as founded on public law, positive engagements, or custom. It is carried on by and through ambassadors, envoys, or other representatives, each state having representatives at the seat of government of every other.——It was one part of the business of the congress assembled at Vienna in 1814, to regulate the degrees of rank to which the various *diplomatic agents* were entitled: viz, 1. Ambassadors. 2. Envoys extraordinary and ministers plenipotentiary. 3. Ministers resident. 4. *Chargés d'affaires*. 5. Secretaries of legation and *attachés*. Ministers at a court are denominated the *diplomatic* body.

DIPLOMAT'ICS (from same), the science of diplomas, or of ancient writing, literary and public documents, decrees, charters, &c., having for its object the deciphering of old writings and ascertaining their authenticity, &c.

DIPLO'PIA (*diplos*, double; and *opsis*, sight: *Gr.*), in Medicine, a disease in the eye, which causes the person to see an object double or treble.

DIP'NOUS (*dipnoos*, with two breathing apertures: from *dis*, double; and *pnoos*, a breath: *Gr.*), in Surgery, an epithet for wounds which have two orifices.

DIP'PING, among Miners, the interruption or breaking off of the veins of ore, an accident often attended with much trouble before the ore can again be discovered.

DIP'PING NEED'LE, an instrument intended to show the magnetic force of the earth. It consists of a magnetic needle, having an axis at right angles to its length, and passing through its centre of gravity. It is capable, therefore, of moving freely in a vertical direction. When the instrument is placed anywhere except on the magnetic meridian, on account of one of its poles being nearer to one of the magnetic poles, and therefore more strongly attracted, than the other, it *dips*, or points downwards towards that predominating pole, and when, by means of a variation compass, it is adjusted so that its motion coincides with the plane of the magnetic meridian, it shows the direction of the *magnetic force*; and the intersections of two or more directions, formed at different places, point out the position of the *magnetic pole*. The *angle of dip* at a given place is ascertained from a graduated circle, to which the needle acts as an index; and the *force* of the magnetic attraction may be ascertained by shifting a movable weight along the raised end until the needle becomes horizontal. In some cases, the needle is made to move freely, both in a horizontal and vertical direction; in which case, a separate variation compass is not required.

DIP'SACUS (*Lat.*; from *dipsakos*, the teasel: *Gr.*), in Botany, a genus including the *Dipsacus Fullonum*, or cultivated teasel, reared in great quantities in the west of England, and employed for raising the nap upon woollen cloths by means of crooked awns upon the heads. For this purpose, these are fixed on the circumference of a large broad wheel, which turns round while the cloth is held against them

DIP'TERA (*dipteros*, with two wings from *dis*, twice, and *pteron*, a wing Gr) in Entomology, an order of insects comprising an immense number of species, of which the house fly is an example As some of this order have no wings, it is distinguished by several peculiarities drawn from other sources Behind the wings is a pair of slender bodies termed *halteres*, or balancers, which are always in motion, and are generally present even when true wings are not developed In some species, as the blow fly, *the eggs are hatched within the body of* the parent, in others as the forest fly, the larva undergoes its metamorphosis in the parent s body, and the young are excluded as *pupæ*

DIP'TYCHA, or DIP'TYCH (*diptuchos*, twofold *Gr*), in Roman Antiquity, a public register of the names of the consuls and other magistrates —— Among the early Christians tablets, on one of which were written the names of the deceased, and on the other those of the living patriarchs, bishops, &c, or of those who had done any service to the church They consisted of two leaves, which folded like a book If the register consisted of more than tw leaves, it was a *poluptuchon* (manifold)

DIPUS (*dipous* two footed from *dis* twice, and *pous*, a foot *Gr*, on account of the disproportionate development of the hinder legs), in Zoology, a genus of rodents between the squirrels and rats, and greatly resembling the kangaroo in the enormous development of the hind legs and tail The Egyptian *Jerboa* has a body eight inches long, and was known to the ancients by that name It is found in various parts of Africa, and in the eastern provinces of Siberia. It lives in burrows, in which it reposes during the day, choosing the night for its excursions, and for obtaining its food

DIPY'RE (*dipuros*, twice put in the fire *Gr* — doubly acted on by fire), a mineral occurring in minute prisms, composed of silica, alumina, and lime Before the blow pipe it becomes phosphorescent, and then fuses

DIRÆ (ill-omened *Lat.*), in the Roman divination, any unusual accidents or uncommon appearances as sneezing, stumbling, strange voices apparitions, spilling salt or wine upon the table or upon one s clothes, meeting wolves, hares, foxes, &c

DIRECT' (*directus*, straight *Lat*) in Law, an epithet for the line of ascendants and descendants in genealogical succession —— Direct, in Astronomy, a term used when a planet moves forward in the zodiac according to the natural order and succession of the signs, in distinction from *retrograde* —— In Optics, a *direct ray* is one which is carried from a point of the invisible object directly to the eye, without being turned out of its rectilinear direction by any intervening body

DIREC'TION, LINE OF (*directio*, from *dirigo*, I send in a straight line *Lat*), in Mechanics, a line along which a given force tends to move a body on which it acts thus, the line of direction of gravity is towards the centre of the earth ——Angle of Direction, the angle comprehended between the lines of direction of two conspiring forces.——Direction Word, in Printing, the word which is sometimes put at the bottom of a page, and which begins the next page

DIREC'TOR (*dirigo*, I arrange *Lat*), a person appointed to transact the affairs of a public company, as, the *director* of a bank, assurance office, &c ——Director, in Surgery, a grooved probe to direct the edge of the knife or scissors in opening sinuses or fistulæ, &c, that by means of it the subjacent nerve and tendons may remain unhurt

DIREC'TORY (*directorius*, that points to some object *Lat*), a book containing an alphabetical list of the inhabitants of a town with their places of abode Also, a book containing directions for public worship or religious services ——In France, the term *directory* was given to five officers to whom the executive authority was committed in 1795 It had the appointment and removal of the ministers of state Its policy was at first moderate and conciliatory, but at last gave great dissatisfaction After existing four years, it was overthrown by the ascendency of Buonaparte

DIRGE (*dirige Lat*) a song or tune, intended to express grief, sorrow, and mourning It is a corruption of the word *dirige*, with which the Roman Catholic service for the dead commences

DIS a prefix or inseparable particle, which generally has the force of a privative and negative as *disarm, disallow, disoblige* In some cases, however, it denotes separation, as in *distribute, disconnect* The Greek word *dis* (twice) means that anything is doubled, the last letter being sometimes cut off

DISABIL'ITY (*dis*, a privative, and *habilitas* fitness *Lat*) in Law, an incapacity under which a person labours, and which prevents him from enjoying certain legal benefits Thus an alien cannot take lands an infant cannot make valid contracts, &c It is produced in four ways viz, by the act of God of the law of the person, or of his ancestors ——*Disability* differs from *inability* in denoting deprivation of ability whereas *inability* denotes destitution of ability, either by deprivation or otherwise

DISAFFOREST, to abolish forest laws and their oppressive privileges with respect to a particular district

DISAGGREGA'TION (*dis*, privative and *aggrego*, I gather together *Lat*), the act or operation of separating an aggregate body into its component parts

DISC, or DISK (*diskos Gr*), the body and face of the sun, the moon, or a planet as it appears to us on the earth, or the body and face of the earth, as it would appear to a spectator at the moon The fixed stars are destitute of any apparent disk, even when viewed by the best telescopes ——In Optics, the magnitude of the lens of a telescope, or the width of its aperture ——Disc, in Botany, the part inside the ray of a radiated compound flower, such as is seen in the marigold or daisy.

DISCHAR'GING ROD (*décharger*, to discharge: *Fr.*), an instrument used in electrical experiments. It generally consists of metal wire with balls at the end, a joint in the middle, and a glass handle.

DISCI'PLE (*discipulus*, from *disco*, I learn: *Lat.*), one who learns anything from another: thus the followers of any teacher, philosopher, &c., are called disciples. In the more common acceptation, among Christians, the disciples denote those who were the immediate followers and attendants on Christ, of whom there were seventy or seventy-two specially selected by him; but the word is also applied to all Christians, as they profess to learn and receive his doctrines and precepts. The words *disciple* and *apostle* are often synonymously used in the gospel history; but sometimes the apostles are distinguished from disciples, as persons chosen out of their number to be the principal ministers of religion.

DIS'CIPLINE (same *deriv.*), subjection to laws, rules, order, and regulations, either in a moral, ecclesiastical, or military sense. Also that chastisement or external mortification which some religious devotees inflict on themselves.

DISCLAIM'ER (*dis*, privative; and *clamo*, I cry out: *Lat.*), in Law, a denial by a tenant of his landlord's title; or the renunciation by an executor before he has proved a will of the executorship; also in equity, a plea by which the defendant renounces all claim to the subject of the demand made by the bill.——In Patent Law, the formal renunciation in writing of something claimed in the specification.

DIS'CORD (*discordia*, from *discors*, dissonant: *Lat.*), in Music, a union of sounds which the ear receives with dislike, whether they are produced together or in succession. A *discord* may, however, be happily introduced into a musical composition; in which case, it adds to the pleasure produced by the chord into which it is resolved, and for which the discordant note is a preparation.

DIS'COUNT, in Commerce, an allowance made on a bill or any other debt not yet become due, in consideration of immediate payment; or any deduction from the customary price of an article. The discounts at banking establishments are usually the amount of legal interest paid by the borrower, and deducted from the sum borrowed at the commencement of the credit. To discount a bill of exchange, signifies to pay it before it is due, deducting a certain part of the sum for the accommodation

DISCOV'ERY (*découvrir*, to discover: *Fr.*), in Law, the disclosing or revealing anything by a defendant in his answer to a bill filed against him in a court of equity.

DISCRE'TIVE (*discretus*, separated: *Lat.*), in Logic, an epithet applied to a proposition expressing some distinction, opposition, or variety, by means of *but*, *though*, *yet*, &c.; as, men change their dresses, *but* not their inclinations.

DIS'CUS (*Lat.*; from *diskos*: *Gr.*), in Antiquity, a quoit made of iron, and sometimes perforated in the middle. The players did not try to hit a mark, but to throw the quoit as far as they could.

DISCU'TIENT (*discutio*, I dispel: *Lat.*), a medicine or application which disperses any coagulated fluid, or tumour.

DISE'ASE, any state of a living body in which the natural functions of the organs are interrupted or disturbed, either by defective or preternatural action. A disease may affect the whole body, or a particular limb or part of the body; and such partial affection of the body is called a *local* or *topical* disease.

DISINFEC'TION (*dis*, privative; and *infectus*, tainted: *Lat.*), in Medicine, purification from infected matter.

DISINTEGRA'TION (*dis*, privative; and *integratio*, a making whole: *Lat.*), the act of separating *integrant* parts of a substance, as distinguished from decomposition or the separation of *constituent* parts. Geologists speak of the disintegration of rocks under atmospheric influences.

DISJUNC'TIVE (*disjungo*, I separate: *Lat.*), in Grammar, an epithet for conjunctions which unite sentences, but separate the sense, as *but*, *nor*, &c.——A DISJUNCTIVE PROPOSITION, in Logic, is one consisting of two or more categorical parts connected disjunctively, and therefore stated alternatively, as 'it was day or night.'——A DISJUNCTIVE SYLLOGISM is one in which the major proposition is disjunctive; as 'the earth moves in either a circle or an ellipsis; but it does not move in a circle, therefore it moves in an ellipsis.'

DISLOCA'TION (*dis*, privative; and *locatio*, a placing: *Lat.*), a displacement of one part with reference to another.

DISMEM'BERED (*démembrer*, to dismember: *Fr.*), in Heraldry, an epithet for birds that have neither feet nor legs; and also for lions and other animals whose members are separated

DISPATCH'ES (*dépêches*: *Fr.*), in Politics, a packet of letters sent by a public officer, on some affair of state or public business.

DISPENSA'TION (*dispensatio*: *Lat.*), in Ecclesiastical affairs, the granting of a licence, or the licence itself, to do what is forbidden by laws or canons, or to omit something which is commanded. Also, a system of principles and rites enjoined: as the *Mosaic dispensation*, that is, the Levitical law and rites.

DISPEN'SATORY (*dispensatorius*, relating to management: *Lat.*),.or PHARMACOPŒ'IA, an authorized volume containing directions for compounding medicines.

DISPER'MOUS (*dis*, twice; and *sperma*, a seed: *Gr.*), in Botany, an epithet for fruits which contain only two seeds.

DISPER'SION (*dispergo*, I scatter about: *Lat.*), in Optics, the separation of the different coloured rays, during refraction, arising from their different refrangibilities.——In Medicine, the removing of inflammation from a part, and restoring it to its healthy state.

DISPLAY'ED (*déployer*, to spread out: *Fr.*), in Heraldry, a term applied to the position of an eagle, or any other bird, when it is erect, with its wings expanded or spread out.

DISPOSI'TION (*dispositio: Lat.*), in Architecture an arrangement of the whole design: it differs from *distribution*, which relates to the arrangement of the internal parts.

DISPUTA'TION (*disputatio: Lat.*), in the schools, a contest, either by words or in writing, on some point of learning, for a degree, prise, or for an exercise. Also a verbal controversy respecting the truth of some fact, opinion, or argument; as when Paul *disputed* with the Jews in the synagogue.

DISQUISI'TION (*disquisitio*, an investigation: *Lat.*), an inquiry into the nature and properties of any problem, question, &c., with the intention of acquiring or imparting a correct knowledge regarding it.

DISRUP'TION (*disrumpo*, I break asunder: *Lat.*), in Geology, a term applied to the violent separation of rocks by an earthquake.

DISSEC'TION (*disseco*, I cut up: *Lat.*), the methodical opening of an organized body, for the purpose of examining its structure and uses. Le Gendre observes, that the dissection of a human body, even dead, was held a sacrilege till the time of Francis I.; and that he has seen a consultation held by the divines of Salamanca, at the request of Charles V., to settle the question whether or not it were lawful, in point of conscience, to dissect a human body for the purposes of anatomical science.

DISSE'ISIN or **DISSE'IZIN**, in Law, a wrongful putting out of him who is seised of the freehold in lands: it is either *single disseisin*, or *disseisin by force*, more properly called *deforcement*.

DISSEN'TER (*dissentio*, I think otherwise: *Lat.*), one who separates from the service and worship of any established church. In England, therefore, the word is particularly applied to those who do not conform to the rites and service of its church as by law established. The principles on which dissenters separate from the church of England are the right of private judgment, and liberty of conscience. They maintain that Christ, and he alone, is the head of the church, and that they bow to no authority, in matters of religion, but that which proceeds from him. In England the Presbyterians are dissenters, in Scotland the Episcopalians.

DISSE'PIMENT (*dissepimentum*, from *dissepio*, I hedge off: *Lat.*), in Botany, a partition or *septum* formed in ovaries, by the united sides of the carpels, whereby cells are formed.

DISSIPA'TION (*dissipatio*, a scattering: *Lat.*), in Physics, the insensible loss or waste of the minute parts of a body, which fly off. By means of it, the body is diminished, or consumed.

DISSOL'VENT (*dissolvo*, I dissolve: *Lat.*), or **SOLVENT**, in Chemistry, a *menstruum*, or anything which has the power of converting a solid substance into a fluid; thus, water is a *dissolvent* of salts.——In Medicine, any remedy supposed capable of dissolving calculi or other concretions in the body.

DIS'SONANCE (*dissonantia*, from *dissono*, I disagree in sound: *Lat.*), in Music, a false consonance: it is synonymous with *discord*, which see.

DIS'TANCE (*Fr.*; from *disto*, I am separated from: *Lat.*), **LINE OF**, in Perspective, a right line drawn from the eye to the principal point; the *point of distance* being a point in the horizontal line at a distance from the principal point equal to that of the eye from the same.——**DISTANCE**, as applied to the turf, is a length of 240 yards from the winning-post of a racecourse. Precisely at this spot is fixed a post corresponding with others, but having a gallery capable of holding three or four persons, which is called the *distance-post*. In this gallery, as well as in that of the winning-post, before the horses start each heat, a person is stationed holding a crimson flag; during the time the horses are running, each flag is suspended from the front of the gallery to which it belongs, and is inclined forward as a horse passes either post. If there happen to be any horse which has not come up to the distance-post before the first horse in that heat has reached the winning-post, such horse is said to be 'distanced,' and is thereby disqualified for running any more during that race.

DISTEM'PER, in the Veterinary art, a disease incident to dogs, horses, and other domestic animals.——In Painting, the use of colours mixed with size and water. On a small scale this is called *body-colour* painting. The old painters made use of white of egg, or the glutinous juice of the young branches of the fig tree.

DIS'TICH (*distichos*: from *dis*, double; and *stichos*, a verse: *Gr.*), a couplet or couple of verses in poetry making complete sense.

DISTILLA'TION (*dis*, apart; and *stillo*, I trickle: *Lat.*), the evaporation and subsequent condensation of liquids. Its discovery has been ascribed to the alchemists, though it was probably known to the Arabians in very early times. On the large scale, it is used for the production of ardent spirits in distilleries. There are two distinct processes in the operations of the distiller: the first is the formation of alcohol from sugar; the second, the separation of the alcohol from the fluid, &c., with which it is associated. In most cases, even the formation of sugar is a part of the distiller's business in this country, as the substance employed is either malt, or a mixture of raw grain and malt. The process consists in the infusion of the ground grain and malt, with constant agitation, in a certain quantity of water, at a proper temperature, in the *mash tun*. After some time the resulting *wort* is run off, fresh water is added, and the process is repeated until scarcely anything soluble remains. When the worts are collected, they are made to ferment, by the addition of good yeast; and when the fermentation is over, the *wash* is subjected to the action of heat: the spirit distils over and is condensed. To purify and strengthen it, by separating the water and *fusel oil*, it is distilled a second time. Sometimes it is purified by filtration through charcoal. The oil comes over most abundantly towards the end of the distillation, when the weak spirit which remains requires an elevation of temperature, which is also favourable to the evaporation of the oil. The process is not difficult to be explained. The diastase of the malt changes the starch of the raw grain into sugar; the fermentation changes the sugar into alcohol; the distillation separates the alcohol from the remaining fluid, on account of its boiling at a lower temperature: the second distillation removes still more of the water and oil, on account of the low temperature at which the comparatively strong solution of alcohol evaporates. The product of spirit from a given quantity of grain depends greatly on the skill and attention of the distiller. The spirit which comes over in the beginning of the first distillation is termed *first shot;* that which comes over last, *feint:* the spirit before the second distillation is called *low wines.* *Proof spirit* is a mixture of about equal parts, by weight, of absolute alcohol and water. Great improvements have been made in distillation: with some of the more perfect stills, a pure and strong spirit can be obtained by one distillation.——DESTRUCTIVE DISTILLATION, the production of gases, acids, &c., by subjecting organic substances to a heat which causes them to be decomposed. In this way *coal gas* is obtained from bituminous coal, and *pyroligneous acid* from wood.——FRACTIONAL DISTILLATION, distillation carried on at several different degrees of temperature, the product of each distillation, at a given degree, being kept separate from the others.

DISTINC'TION (*distinguo*, I make a difference: *Lat.*), in Argumentation, the admission of what is said by an adversary, to be true in one sense, but not in another. Thus, if it be asserted that 'age is venerable,' we may *distinguish*, by admitting this to be true of a *virtuous* old age, but denying it of one that is *corrupt*.

DIS'TOMA, a genus of intestinal worms. [See FLUKE.]

DISTRESS' (*distringo*, I strain hard: *Lat.*), in Law, the proceeding of entering upon land and houses, and seizing the movable property, growing crops, &c., with a view of selling the same for the purpose of satisfying some claim. Landlords have a right of distress for rent which has become due. A distress cannot be made after sunset, or before sunrise. Gates cannot be broken open, nor can the outer door of a dwelling-house or building be forced open in order to make a distress. The goods distrained cannot be sold until five days from the making of the distress have expired. Certain species of personal chattels are exempt from distress, particularly the utensils and instruments of a person's trade and profession—if in *actual use.* All distresses for rent must be made by day. But if the tenant fraudulently removes goods from the premises, the landlord may, within thirty days, seize such goods, wherever found, unless they are sold for a valuable consideration before the seizure. [See REPLEVIN.]

DISTRIBU'TION (*distributio: Lat.*), the act of dividing or separating; as, the distribution of property among children, or the distribution of plants into genera and species.——In Architecture, the dividing and disposing of the several parts of a building, according to some plan, or to the rules of the art.——In Medicine, the circulation of the chyle with the blood.——In Printing, the inverse of *composition.* It consists in throwing the types or letters, one by one, into those compartments of the cases to which they belong.——In Logic, a term is said to be distributed in a proposition when it is employed in its full extent, so as to comprise everything to which the term can be applied. Thus *man is weak,* where the term man is distributed, and weak undistributed, since there are other things weak besides man.——DISTRIBUTIVE JUSTICE, justice so administered by a judge as to give every man his due.——DISTRIBUTIVE, in Grammar, an epithet for words which serve to distribute things into their several orders, as *each, either, every,* &c.

DIS'TRICT (*districtus*, stretched out: *Lat.*), a word applicable to any portion of land or country, or to any part of a city or town, which is defined by law or agreement. A governor, a prefect, or a judge may have his *district,* or states and provinces may be divided into *districts* for public meetings, the exercise of elective rights, &c.——DISTRICT, in Law, that circuit or territory within which certain laws may be in force, or regarding which certain regulations, &c., may have been made.

DISTRIN'GAS (you are to distrain: *Lat.*), a writ in common law proceedings addressed to the sheriff, directing him to compel the appearance of a defendant, or to distrain the goods of a defendant.——In Chancery, a writ called a distringas issues to compel the appearance of a corporation aggregate. Also a writ to restrain the Bank of England from transferring stock or paying dividends.

DITHYRAM'BUS (*Dithurambos*, Bacchus: *Gr.*), a sort of hymn anciently sung in honour of Bacchus, full of excitement and poetical rage: any poem written with wildness. The *dithyrambic poetry* was very bold and irregular, for the poets not only took the liberty to coin new words for the purpose, but made double and compound words, which contributed very much to the wild magnificence of this kind of composition.

DI'TONE (*ditonos:* from *dis*, double; and *tonos*, a tone: *Gr.*), in Music, an interval comprehending two tones.

DITREM'ATOUS. [See MONOTREMATOUS.]

DITRIHED'RIA (*dis*, twice; *tris*, thrice; and *hedra*, a base: *Gr.*), in Mineralogy, a genus of crystals with six sides or planes; being formed of two trigonal pyramids joined base to base, without any intermediate column.

DIT'TANY OF CRETE, a species of marjoram used as a febrifuge, the *Origanum dictamnus* of botanists, a native of Candia.

DIT'TO (*detto*, said: *Ital.*), contracted into *Do.* in books of accounts, signifies 'the aforesaid.' It is used to avoid repetition.

DIURET'ICS (*diourētikos*, promoting a discharge of urine: *Gr.*), medicines which have the power to promote or increase the discharge of urine.

DIUR'NAL ARCH (*diurnus*, daily: *Lat.*), in Astronomy, the arch or number of degrees that the sun, moon, or stars describe between their rising and setting.——DIURNAL MOTION of a planet, so many degrees and minutes as any plane moves in twenty-four hours.

DIVAN' (an audience chamber: *Turk.*), a council-chamber or court, in which justice is administered in the eastern nations, particularly among the Turks. There are two sorts of divans: that of the grand seignior, called the council of state, which consists of seven of the principal officers of the empire; and that of the grand vizier, composed of six other viziers or councillors of state, with the chancellor, and secretaries of state, for the distribution of justice. — The word *divan*, in Turkey, also denotes a kind of stage, which is always found in the halls of the palaces, and in the apartments of private persons. It is covered with costly tapestry, and has a number of embroidered cushions leaning against the wall; the master of the house reclines on it when he receives visitors. From this, a kind of sofa has obtained the name of divan.

DIVAR'ICATE (*divarico*, I spread out: *Lat.*), in Botany, an epithet for a branch which spreads out wide, or forms an obtuse angle with the stem. It is also applied to peduncles and petioles.

DIVER'GENT (*di*, asunder; and *vergo*, I turn: *Lat.*), spreading out.——DIVERGING LINES, in Geometry, those which constantly recede from each other.——DIVERGENT RAYS, in Optics, those rays which spread out more and more as they recede from their source: opposed to *convergent*. Concave glasses render the rays divergent, and convex ones convergent.——DIVERGING SERIES, in Mathematics, a series the terms of which always become larger the further they are continued.

DIVER'SION (*diverto*, I turn a different way: *Lat.*), in Military tactics, an attack on an enemy, by making a movement towards a point that is weak and undefended, in order to draw his forces off from continuing operations in another quarter.

DIV'IDEND (*dividendum*, something to be divided: *Lat.*), the part or proportion of profits which the members of a society or public company receive at stated periods, according to the share they possess in the capital or common stock of the concern. The term is applied also to the annual interest paid by government on various public debts. In this sense, the order by which stockholders receive their interest is called a *dividend warrant*, and the portions of interest not called for are denominated *unclaimed dividends*. It also signifies the sum a creditor receives from a bankrupt's estate.——DIVIDEND, in Arithmetic, the number to be divided into equal parts by the *divisor*.

DIVI-DIVI, the Indian name of a leguminous tree, *Cæsalpinia coriaria*, growing in South America, the pods of which are very rich in astringent principles, and are employed in tanning leather.

DIVI'NA COMME'DIA LA the name by which Dante's great poem is known, although its author styled it only *La Commedia*, saying, that he called it a Comedy because, contrary to the fashion of tragedy, it begins with sorrow and ends with joy. It was not published entire until after Dante's death, which occurred in 1321. The poem, written in *terza rima*, is the story of a vision, and is divided into three books, the Inferno, the Purgatorio, and the Paradiso (Hell, Purgatory, and Heaven), whither he supposes himself in spirit to be successively transported. Much of the poem is allegorical, as he himself stated to his friends, telling them that it had many meanings. Dante was a sincere son of the church, but he has unsparingly attacked the papal court, and urged the necessity of reform. There are many passages of stern invective, and bitter indignation, directed against persons and cities; but there are not wanting instances of vivid description and tender beauty. His great excellence, however, is thought to consist in his mastery over the feelings, and his acquaintance with the workings of the heart of man. Many translations have been made into English, and almost all other European languages have their own versions. The Italian editions have been very numerous, and the disquisitions and commentaries upon it would fill a library of respectable size.

DIVINA'TION (*divinatio*: *Lat.*), the pretended art of discerning future events, or such as cannot be known by ordinary or natural means. The ancient philosophers divided divination into two kinds, natural and artificial. *Natural* divination was supposed to be effected by a kind of inspiration or divine afflatus; *artificial* divination by certain rites, or observances, which we have explained under their respective titles. All the ancient Asiatic tribes had modes of divination: the Egyptians and Greeks had their oracles; and, with the Romans, divination and witchcraft were brought into a kind of system, and constituted part of their religion. In truth, there has hardly been a nation discovered, which had advanced beyond the lowest barbarism, that did not practise some kinds of divination; and even in the ages in which reason has most prevailed over feeling, the belief in the power of discerning future events has been entertained. Even the wise Socrates was wont to assert that the science of divination was necessary for all persons who would govern successfully either cities or their own families.

DI'VING (*dippan*, to dive: *Sax.*), the art of descending under water to a considerable depth, and remaining there for a length of time, as occasion may require. The practice of diving is resorted to for the recovery of things that have been lost in the water. An apparatus is now very generally employed, in which the head of the diver is covered by a helmet of thin sheet copper, large enough to admit of its easy motion, and capable of containing from six to eight gallons of air. The helmet comes pretty far down on the breast and back, and has in front three eye-holes, covered with glass, and protected by brass wire. This helmet is united to a waterproof canvas jacket by means of rivets, so tightly that no water can be introduced to the body of the diver. The junction of the helmet and jacket is stuffed, so that it may clasp the shoulders of the diver firmly. A leather belt passes round the neck, to which are attached two weights, one before and the other behind, each about 40lbs., in order that the diver may descend with facility; but, to provide against any accident when he is at the bottom, the belt is secured with a buckle in front, which he can instantly unfasten; and thus, dropping the weights, he rises to the surface. The diver is supplied with fresh air by means of a flexible waterproof pipe, which enters the back of the helmet, and communicates with an air-pump at work above in the vessel from which the diver descends. From the back part of the helmet also there issues an eduction pipe, to allow the escape of the breathed air. In order that the diver may give notice to the attendants at the top, when he requires a hook, tackle, bucket, or any alteration in the supply of fresh air, he is furnished with a single line, which passes under his right arm He descends from the side of the vessel by means either of a rope or wooden ladder loaded at the lower end (but more frequently by the former). When he reaches the bottom, the rope is let down, till it becomes slack, to prevent the motion of the vessel from affecting him; and he carries a line in his hand, that he may, when necessary, return to the rope, if he lets it go. To make himself as comfortable as possible under water, he puts on two suits of flannel, over which he has a dress of waterproof cloth, which entirely covers his body, the only apertures being at the neck and wrists, and these are water-tight. The diver is thus enabled to remain several hours at a time under water, all the while perfectly dry, his motion being rendered quite steady by weights attached to his shoes.

DI'VING-BELL, a mechanical contrivance, by which persons may descend below the surface of the water and remain there for some time without inconvenience. It is most usually made in the form of a truncated cone, the smaller and upper end being closed and the larger open; and it is used for the recovery of property that is sunk in wrecks, &c. Of late years it has also been much employed to assist in laying the foundations of buildings under water. To illustrate the principle of this machine, take a glass tumbler and plunge it into water with the mouth downwards; you will find that very little water will rise into the tumbler, which will be evident if you place a piece of cork inside; for its upper side will be perfectly dry, the air which was in the tumbler having prevented the entrance of the water. But, as air is compressible, it cannot entirely exclude the water, which condenses it a little, by pressure. Modern improvements have rendered this apparatus perfect. The air pumped in not only supplies the divers, but empties the bell of water. It is made heavy enough to sink itself, and is so constructed that it cannot easily overset, even if it meet a sunken rock. Signals render communication between the divers and those above very simple and effective. By letting air through a stopcock into a water-tight compartment in the upper part, the bell becomes so light as to ascend, and by letting water into the same compartment, the bell is made sufficiently heavy to descend. The divers, therefore, have the machine completely under their own control.

DIVISIBIL'ITY (*divisibilis*, that may be divided: *Lat.*), that property by which the particles of matter in all bodies are capable of mechanical separation or disunion from one another. As it is evident that a body is extended, so it is no less evident that it is divisible; for, since no two particles of matter can exist in the same place, it follows that they are really distinct from each other, which is all that is meant by being divisible. In this sense, the least conceivable particle must still be divisible, since it will consist of parts which will be really distinct. Thus far, extension may be considered as divided into an unlimited number of parts, but with respect to the limits of the actual divisibility we are still in the dark. That matter may, even with the means at our disposal, be divided to a surprising extent, is easily proved by many simple experiments. A single grain of sulphate of copper, or blue vitriol, will communicate a fine azure tint to five gallons of water. In this case, the sulphate is attenuated at least ten million times. Odours are capable of yet wider diffusion: a single grain of musk is sufficient to perfume a room for twenty years.

DIVIS'ION (*divisio*: *Lat.*), the act of separating any entire bodies into parts.——DIVISION, in Arithmetic, one of the four fundamental rules, by which we find how often a less number, called the *divisor*, is contained in a greater, called the *dividend*, the number of times which the divisor is contained in the dividend being termed the *quotient*.——DIVISION, in Music, the dividing the interval of an octave into a number of less intervals. The fourth and fifth divide the octave perfectly, though differently: when the fifth is below, and serves as a bass to the fourth, the division is called *harmonical*, but when the fourth is below it is called *arithmetical*.——DIVISION, among Logicians, the unfolding of a complex idea, by enumerating the simple ideas of which it is composed.——In Rhetoric, the arrangement of a discourse under several heads.——DIVISION, part of an army, as a brigade, a squadron, or platoon.——A part of a fleet, or a select number of ships under a separate commander, and distinguished by a particular flag.

DIVIS'ION OF LA'BOUR, in Political Economy, an expression employed to designate that apportionment of occupations, by means of which an individual labourer is restricted to the repeated execution of the same operation, or at least of a small number of operations. Adam Smith said that the superiority of civilized nations over savages is entirely owing to this regulation; and he pointed out that the advantages attending it are:—1. That workmen do not lose time by quitting one kind of occupation for another, by having to change their places, positions, or implements. 2. That the mind and hand acquire a wonderful skill in performing simple and often-repeated operations. 3. That the division of labour leads to the discovery of contrivances for the abridgment of labour. It reduces each operation to a very simple, and often-repeated process; and it is this kind of labour which is most easily performed by implements or machinery.

DIVO'RCE (*divortium*, from *diverto*, I separate: *Lat.*), a separation, by law, of husband and wife. It is either a divorce *à vinculo matrimonii*, that is, a complete dissolution of the marriage bond, by which the parties become as entirely disconnected as those who have not been joined in wedlock; or a divorce *à mensâ et thoro* (from bed and board), by which the parties are legally separated, but not unmarried. Divorces are now obtained in the Court of Divorce, in consequence of adultery on the part of the wife, or of adultery, with cruelty or certain other serious offences, on the part of the husband, unless the petitioner has connived at or condoned the adultery, or been guilty of adultery also, or has too long delayed bringing the matter into court. A divorce *à mensâ et thoro* is now termed a *judicial separation*, and is obtained on account of cruelty on the part of the husband or wife, or adultery alone on the part of the husband: it gives the wife, as to property and in other respects, the condition of a *feme sole*. Damages may be obtained by the injured husband from the *co-respondent* or paramour; more or less of the fortune brought by the guilty wife may be allotted to the support of the children of the dissolved marriage; and whether the marriage is dissolved, or there is only a judicial separation, on petition of the wife, an order for alimony to her may be made. An appeal lies from this court to the House of Lords; but after the time limited for this purpose has expired, or the decree has been confirmed, the parties may marry as if the prior marriage had been dissolved by death.

DOBEREI'NER'S LAMP, a small instrument for obtaining instantaneous light, in which a jet of hydrogen gas is inflamed by coming into contact with spongy platinum.

DOCE'TÆ (*dokēsis*, an opinion: *Gr.*), a sect that looked upon all the acts and sufferings of Christ as having taken place only in appearance.

DOCIM'ASY, or the DOCIMAS'TIC ART (*dokimasia*, an examination, from *dokimazo*, I prove: *Gr.*), the art of assaying metals, or separating them from foreign matters, and determining the nature and quantity of metallic substance contained in any ore or mineral.

DOCK (*docke*: *Germ.*), an artificial basin for the reception of ships.——WET DOCKS are constructed with gates, which, when shut, keep the ship afloat at low water. They are used for loading or unloading vessels out of the influence of the tide.——DRY DOCKS, called also *graving* docks, are left dry by the sea, or are rendered so by pumping. They are used for building, repairing, and examining ships.

DOCK'ET (*etiquette*, a ticket: *Fr.*), in Law, an abridged entry of an instrument or proceeding on a small piece of paper or parchment.

DOCK'YARD, an arsenal, containing all sorts of naval stores and timber for shipbuilding. In England, the royal dockyards are at Chatham, Portsmouth, Plymouth, Deptford, Woolwich, and Sheerness, where many of Her Majesty's ships and vessels of war are generally moored during peace, and such as want repairing are taken into the docks and refitted.

DOC'TOR (a teacher: *Lat.*), a person who has passed all the degrees of a faculty, and is empowered to practise and teach it; or, according to modern usage, one who has received the highest degree in a faculty. The title of *doctor* originated at the same time with the establishment of universities, and is either conferred publicly with certain ceremonies, or by diploma. We have doctors of divinity (D.D.); of Medicine (M.D.); of Civil Law (D.C.L.); and of Laws (LL.D.); the two last being frequently honorary merely. In Germany there are doctors of Philosophy (Ph. D.).

DOC'TRINAIRES (*Fr.*), a party in the French chamber of deputies on the second restoration of the Bourbons, who would rank themselves neither among the friends of absolute power, nor among the defenders of the revolution. They opposed the ultra-royalists, and took a middle course, avowing themselves the supporters of a constitutional monarchy.

DOC'TRINE (*doctrina*: *Lat.*), a principle or position in any science, laid down as true by an instructor therein. Thus, the *doctrines* of the Gospel are the principles or truths taught by Christ and his apostles. But, as *any* tenet or opinion is a doctrine, doctrines may be either true or false.

DOC'UMENT (*documentum*, a proof: *Lat.*), any official or authoritative paper, containing written instructions or evidence.

DOD'DER (*todter*, the slayer: *Teut.*, because injurious to plants), the common name of some parasitical plants, belonging to the genus *Cuscuta*, nat. ord. *Cuscutaceæ*. The two British species attach themselves to hops, flax, nettles, &c.

DODEC'AGON (*dōdeka*, twelve; and *gōnia*, an angle: *Gr.*), a regular polygon of twelve sides. Its area is equal to the square of one of its sides multiplied by 11·196.

DO'DECAHE'DRON (*dōdeka*, twelve; and *hedra*, a base; *Gr.*), one of the five Platonic bodies, or regular solids. Its surface consists of twelve equal and regular pentagons, and is found by multiplying the square of the side of one of its pentagons by 20·64578, and its solid contents by multiplying the cube of one of the same sides by 7·66312.

DODECAN'DRIA (*dōdeka*, twelve; and *anēr*, a male: *Gr.*), the 11th class in the Linnæan system of Botany, comprehending those plants which have flowers with twelve stamens and upwards, as far as nineteen inclusive, as dyer's weed, purslane, houseleek, &c. The essential character is, that the stamens, however numerous, are inserted into the receptacle.

DO'DO, the popular name of an extinct bird, which formerly lived in the Mauritius, the *Didus ineptus* of naturalists. It was an unwieldy creature, with short wings and a strong beak, the upper mandible being curved. So scanty is the evidence of its former existence, that some naturalists have doubted whether such a bird as the Dodo ever lived. Its place amongst the birds has also been debated, but it would seem best classed with the ground pigeons.

DODO'NIAN, in Antiquity, an epithet given to Jupiter, because he was worshipped in a temple built in the forest of Dodona, where was the most celebrated, and, it is said, the most ancient oracle in Greece.

DOG (*dogghe: Dut.*), the *Canis familiaris*, an animal well known for his attachment to mankind. [See CANIS.]

DOG'BANE, the common name of plants belonging to the genus *Apocynum*, nat. ord. *Apocynaceæ*. The *A. androsæmifolium* is a perennial North American plant, the root of which is intensely bitter and nauseous, and is employed in the form of a powder for the same purposes as *ipecacuanha*.

DOG'-DAYS. [See CANIC'ULAR DAYS.]

DOG'-FISH, in Ichthyology, the popular name of several species of shark. Although dog-fishes rarely venture to attack mankind, they commit great ravages in the fisheries by their voracity. The flesh of all the species is hard, dry, and unpalatable, requiring to be well soaked before it is eaten; but a considerable quantity of oil is obtained from the liver. The rough skin of the *Scyllium Catulus*, or common dog-fish, is used by joiners and other artificers for polishing wood, &c.

DOG'-STAR, or SIRIUS, a star of the first magnitude in the constellation *Canis major* (the greater dog: *Lat.*). It is the brightest of all the fixed stars.

DOG'WOOD, a name applied, in England, to any of the shrubby species of *Cornus*, nat. ord. *Cornaceæ;* in the West Indies, to the *Piscidia Erythrina*, nat. ord. *Leguminosæ*. The former are mere ornamental shrubs; the latter yields a powerful narcotic. The *Cornus sanguinea*, or cornel-tree, is a common shrub in English hedges.

DOGE (*Fr.*), formerly the title of the chief magistrate in the republics of Venice and Genoa. The dignity was elective in both places. At Venice it continued to be for life; but at Genoa, from 1528 until the title of Doge was abolished in Italy by the French, in 1797, it was held only for two years. His power became, by degrees, very limited.

DOG'GER (*dogre: Fr.*), the name of a two-masted Dutch fishing vessel. In some of our old statutes we meet with *dogger-men*, denoting the fishermen whose vessels were of this description.

DOG'GREL, a kind of loose, irregular, burlesque poetry.

DOG'MA (*Gr.*, from *dokeo*, I think), a principle, maxim, or tenet, particularly with regard to matters of faith and philosophy; as, the *dogmas* of the church, the *dogmas* of Aristotle.

DOG'MATISTS (*dogmatistæ*, from *dogmatizo*, I lay down an opinion: *Gr.*), a sect of ancient physicians, of which Hippocrates was the first. They laid down definitions and divisions, reducing diseases to certain genera, and those genera to species, and furnishing remedies for them all; supposing principles, drawing conclusions, and applying those principles and conclusions to the particular diseases under consideration.

DOIT (*duyt: Dut.*), the ancient Scottish penny-piece, twelve of which were equal to a penny sterling. Two of them were equal to the *bodle*, six to the *baubee*, and eight to the *acheson*.

DOLA'BRIFORM (*dolabra*, an axe; and *forma*, a form: *Lat.*), hatchet-shaped. In Botany, applied to leaves which are cylindrical at the base, grow broader at the upper part, and are thick on one edge and very thin on the other.

DOLE, in our ancient customs, signified a part or portion of a meadow where several persons had shares. It now means a distribution or dealing of alms, or a liberal gift made to the people or to some charitable institution.

DOLICHOCEPH'ALIC (*dolichos*, long; *kephale*, the head, *Gr.*), a term applied by comparative anatomists to skulls of an elongated form, such as those of negroes; opposed to *brachycephalic*.

DO'LIUM (a very large jar: *Lat.*), a genus of molluscs inhabiting univalve shells, of a figure approaching to round, so as to seem distended, and, as it were, inflated. They are found in the Mediterranean and other seas.

DOL'LAR, a silver coin of the United States of America, of the value of about 4*s.* 3*d.* sterling; it contains 100 cents. In Prussia the *thaler* or dollar is worth about 3*s.* Bavaria, Hanover, Denmark, and Hamburg, have also *thalers* of different values. The English give the name dollar to the Spanish *piastre*, worth about 4*s.* 4*d.*

DOL'MAN, a kind of long cassock worn by the Turks, hanging down to the feet, with narrow sleeves buttoned at the wrist.

DOL'OMITE, a variety of magnesian carbonate of lime, so called from the French geologist Dolomieu. It belongs to the Permian division of the Palæozoic period. It occurs under considerably diversified aspects, constituting beds of very great extent, and abounding in the Apennines, the Tyrol, Switzerland, and Tuscany. It is of various shades of white; and both in Europe and America it is frequently employed as marble.

DOL'PHIN (*delphin: Lat.*), a name given both to a genus of acanthopterygious fishes and to members of the cetacean genus *Delphinus*. The former includes the *Coryphæna hippurus*, celebrated in poetry for its display of colours when dying. The *Delphini* are allied to the porpoises.

DOM (*dominus*, a lord: *Lat.*), a title given, in the middle ages, to the pope; but, more recently, to members of certain monastic orders—thus to the Benedictines.

DOME (*domus*, a house: *Lat.*), in Architecture, a spherical or other concave roof, over a circular or polygonal building. A *surbased* or *diminished dome* is segmented on its section. A *surmounted dome* is higher than the radius of its base. The most ancient dome at present existing is that of the Pantheon at Rome. The following are the diameters (in feet) of some of the most remarkable domes :—

	diam.	*height*
Pantheon, at Rome	142	143
Duomo, at Florence . . .	139	310
St. Peter's, at Rome . . .	139	330
St. Sophia, at Constantinople	115	201
Ancient Baths of Caracalla.	112	116
St. Paul's, London	112	215

DO'MESDAY or DOOMS'DAY BOOK (*dom*, lord ; and *deya*, a proclamation ; *Celt*), a book or record made by order of William the Conqueror, which now remains in the exchequer, and consists of two volumes, a large folio and a quarto ; the former contains a survey of all the lands in most of the counties in England, and the latter comprehends some counties that were not at first surveyed The 'Book of Domesday' was begun by five justices, assigned for that purpose in each county, in the year 1081, and finished in 1086. It was of such authority, that the Conqueror himself allowed some cases in which he was concerned to be determined by it. Camden calls it the tax-book of king William ; and it was further called *Magna Rolla*. There is likewise a third domesday book, made by command of the Conqueror, and also a fourth, which is an abridgment of the others

DOM'ICILE (see next), in Law, the place of permanent residence of a person. This has frequently to be considered with reference to the wills of persons dying in a foreign country, it being a maxim of our law that all personal property is to be considered as being in that country where its owner is domiciled, and consequently the laws of that country are those according to which it is to be distributed.

DOMICIL'IARY (*domicilium*, a residence : *Lat*), pertaining to an abode or residence. Hence, a *domiciliary visit* signifies a visit to a private dwelling, particularly for the purpose of searching it, under authority.

DOM'INANT (*dominans*, ruling over; *Lat.*). In Music, the *dominant* or sensible chord is that which is practised or the dominant or *fifth* of the key, and which introduces a perfect cadence. Every perfect major chord becomes a dominant chord as soon as the seventh minor is added to it.

DOMIN'ICAL LETTER (*dies dominica*, the Lord's day : *Lat.*), in Chronology, that letter of the alphabet which points out in the calendar the Sundays throughout the year. This mode of representing the days of the week in almanacs by placing a letter opposite to the day of the month, has fallen into disuse, the initial letters of the name of the day itself being used instead.

DOMIN'ICANS, called also *Predicants*, or *Preaching Friars*, an order of monks founded by Dominic, a native of Spain, in 1215. The establishment of this order was due to the apprehensions of the papacy, excited by the rise and spread of opinions hostile to its doctrines and authority; the secular and regular clergy of the time being little disposed to rouse themselves from their indolence and vices, to combat with their assailants. As soon as the Dominicans had fulfilled their first mission, by the destruction of the Albigensian heresy, as it was called, the order was permanently established by a bull of Honorius III. In France they were called *Jacobins*, because the first convent in Paris was in the *Rue St. Jacques*. The *military order of Christ* was originally composed of knights and noblemen, whose duty it was to wage war against heretics. After the death of the founder, this became the order of the penitence of St. Dominic, for both sexes. In course of time the Dominicans were superseded in the schools and courts by the Jesuits.

DOMIN'ION (*dominium : Lat.*), in the Civil Law, the power to use or dispose of a thing as we please. *Dominium plenum* is when the property is united with the possession. *Dominium nudum*, when there is the property without the possession. *Dominium* is again divided into that which is acquired by the law of nations, and that which is acquired by the civil law. The former can never be had without possession, the latter may. *Directum Dominium* is the right alone of dominion. *Dominium utile*, the profit accruing from it. Thus the wife retains the *dominium directum* of her jointure, and the *dominium utile* passes to her husband.——In a general sense, *Dominion* signifies either sovereign authority, or territory within the limits of the authority of a prince or state ; as, the British *dominions*.

DOM'INO (*Ital.*), a masquerade dress, worn by gentlemen and ladies, consisting of a long silk mantle, with a hood and wide sleeves. It was formerly a dress worn by priests in the winter, which, reaching no lower than the shoulders, served to protect the face and head from the weather.——DOMINOES, a game played by two or more persons, with twenty-eight pieces of ivory, called cards, and variously dotted on one side like dice.

DOM'INUS (*Lat*), in the Civil Law, one who possesses anything by right or purchase, gift, loan, legacy, inheritance, payment, contract, or sentence.——DOMINUS, in the feudal law, one who grants a part of his estate in fee to be enjoyed by another.

DON (*dominus*, a lord : *Lat.*), a title which in Spain is given to every one from the king to the poorest gentleman, but in Portugal is restricted to the royal family and the higher nobility. All the ladies in both countries are styled *Dona*.

DONA'TION (*donatio : Lat.*), in Law, the act or contract by which a person transfers to another either the property or the use of something, as a free gift. In order to be valid, it supposes a capacity both in the donor and donee, and requires consent, acceptance, and delivery.——The conferring of certain benefices on a clerk, by deed of gift alone, without presentation, institution, or induction ; but he cannot legally officiate until he obtains the bishop's licence.

DO'NATISTS, a sect of Christians in Africa, who took the name from their founder Donatus. They held that theirs was the only pure church, and that baptism and ordination, unless conferred by them, were invalid. The Donatists made themselves formidable, when swarms of fanatical peasants, inflamed by their doctrines, in 348, under the name of *Circumcelliones*, attacked the imperial army, and for thirteen years after desolated Mauritania with pillage and murder. Martyrdom was eagerly sought by them, and they voluntarily gave themselves up to be executed. This sect was finally extinguished when the country was conquered by the Saracens.

DO'NATIVE (*donatio*, a gift: *Lat.*), a church or chapel founded by the sovereign or by his permission, and intended to be merely the gift of the patron, subject to his visitation only, and not that of the ordinary; and, by the mere act of donation, vested in the clerk, who does not require the ordinary's leave to officiate. But if the patron once presents a clerk to the bishop, he loses his privilege.——DONATIVE, among the Romans, was properly a gift made to the soldiers, as *congiarium* was that made to the people.

DON'JON (a turret: *Fr.*), in Fortification, a strong tower or redoubt, into which the garrison of an ancient fortress might retreat in case of necessity, and capitulate with greater advantage.

DOOM PALM, a palm with fan-shaped leaves, which grows in Upper Egypt, and is remarkable for the way its branches grow, forking and reforking. The ripe fruit resembles gingerbread in flavour, and is eaten by the peasants. The nut is eaten by the Ethiopians before it is ripe. When ripe, it is so hard as to serve for the sockets of dirks.

DOR'IC, an epithet for anything belonging to the Dorians, an ancient people of Greece. The *Doric dialect* was broad and rough, yet there was something venerable and dignified in its antique style; for which reason it was often made use of in solemn odes, &c.——The DORIC ORDER of Architecture is the second of the five orders, being that between the Tuscan and Ionic. It is distinguished for simplicity and strength, and is used in the gates of cities and citadels, on the outside of churches, and in other situations where embellishment is unnecessary or inappropriate.——The DORIC MODE, in Music, was the first of the authentic measures of the ancients, and grave rather than gay.

DOR'MANT (*dormio*, I sleep: *Lat.*), an epithet expressive of a state of inaction or sleep, termed *hibernation*, from its taking place usually in winter. Hence *dormant* animals are such as remain several months in the year apparently lifeless, or, at least, in utter inactivity. The period of long sleep generally begins when the food of the animal grows scarce, and inactivity spreads over the vegetable kingdom; and instinct then impels it to seek a safe place for the period of rest. The bat hides itself in dark caves, or in walls of decayed buildings; the hedgehog envelopes itself in leaves, and generally conceals itself in fern brakes; and the marmot buries itself in the ground. A state of partial torpor takes place in the case of the common bear, the badger, and the racoon. During this period we observe in the animals, first a decrease of animal heat; and secondly, that they breathe much more slowly and uninterruptedly than at other times. The digestion also is much diminished; the stomach and intestines are usually empty; and even if the animals are awakened, they do not manifest symptoms of appetite, except in heated rooms. Snails also have a period of inaction, but whilst this takes place during winter in cold countries, it is during summer in warm.——DORMANT, in Heraldry, the posture of a lion, or any other beast, lying along in a sleeping attitude, with the head on the fore paws, by which it is distinguished from the *couchant*, where, though the beast be lying, yet he holds up his head.——DORMANT (or sleeping) PARTNER, one who takes no share in the active business of a partnership, but is entitled to a proportion of the profits, and subject to a share of the losses.

DOR'MER, or **DOR'MENT** (same *deriv.*), in Architecture, a window made in the roof of a building.

DOR'MOUSE (same *deriv.*), in Zoology, a rodent animal, the *Myoxus avellanarius* of naturalists. During the rigour of winter dormice retire to their bed of moss or dry leaves, made in a hollow tree or under shrubs, and, rolling themselves up, fall into a torpid or lethargic state, which lasts, with little interruption, throughout that cheerless season. Sometimes they experience a short revival, on a warm, sunny day, when they take a little food, and then relapse into their former condition.

DOR'NOCK, a kind of figured linen, of stout fabric, manufactured for coarse tablecloths. It derives its name from a town in Scotland, where it was first made.

DOR'SAL (*dorsum*, the back: *Lat.*), an epithet for what belongs or relates to the back, as the *dorsal fins* of fishes.

DORSIF'EROUS (*dorsum*, the back; and *fero*, I bear: *Lat.*), in Botany, a term applied to ferns which bear the spore cases on the back of the frond.

DOSE (*dosis*, a giving: *Gr.*), in Chemistry, the quantity of any substance which is added to any solution, &c., in order to produce any chemical effect.

DOS'SIL or **DOR'SEL** (*dorsum*, a back: *Lat.*), in Surgery, a pledget, or piece of lint made into a cylindrical form.

DOT'TEREL, a small grallatorial bird, the *Charadrius Morinellus*. It inhabits the northern parts of Asia and Europe, and is migratory, appearing on our moors and downs when going to, and again when returning from, the breeding-place.

DOU'BLE ENTEN'DRE (*Fr.*), any phrase which has a covert as well as an obvious meaning.

DOU'BLE STARS. [See STARS.]

DOUB'LET (*Fr.*), among Lapidaries, a counterfeit stone composed of two pieces of crystal, with a colour between them, so that they have the same appearance as if the whole substance were coloured.——Amongst Opticians, a lens composed of two glasses.

DOUB'LING (*doubler*, to double: *Fr.*) *a cape*, is to sail round or pass beyond it, so that the point of land shall separate the ship from her former situation.

DOUBLOO'N, a Spanish gold coin containing two pistoles, and of the value of 16*s.* 2*d.* sterling.

DOU'CINE (*Fr.*), in Architecture, a moulding, concave above and convex below, serving as a cymatium to a delicate cornice.

DOVE (*taube: Germ.*), the popular name of birds of the genus *Columba*, of which there are four British species, namely: the *ring-dove* (*Columba palumbus*), the largest of the pigeon tribe, so wild that it cannot be domesticated; the *stock-dove*, or common wild pigeon (*C. œnas*), which is migratory; the *rock-dove* (*C. livia*), which builds in high cliffs near the sea; and the *turtle-dove* (*C. turtur*), also migratory, a shy and retired bird, living in the woods.

DOV'ETAIL, in Carpentry, the manner of fastening boards together by letting one piece into another, in the form of a dove's tail spread, or a wedge reversed; it is the strongest of all jointings.

DOW'AGER (from *dower*), in Law, properly a widow who enjoys a dower: the term is applied particularly to the widows of princes and noblemen. The widow of a king is a *queen-dowager*.

DOW'ER (*douaire: Fr.*), in Law, the portion which a widow has of her husband's lands and tenements, to enjoy during her life.

DOWN (*dunn: Dan.*), the softest and most delicate feathers of birds, particularly of geese, ducks, and swans, growing on the neck and part of the breast. The *eider-duck* yields the best kind.——Also the fine feathery substance by which seeds are conveyed to a distance by the wind; as in the dandelion and thistle. This is called *pappus* by botanists, and consists of the upper part of the calyx, the lower part adhering to the fruit.

DOWNS (*düne*, a large open plain: *Germ.*), banks or elevations of sand, which the sea gathers and forms along its shore, and which serve it as a barrier. The term is also applied to tracts of naked land on which sheep usually graze. The North and South Downs are two ranges of chalk hills, of a smooth rounded outline, covered with short herbage in the south-east of England.——THE DOWNS is a celebrated roadstead on the coast of Kent, between the North and South Forelands, where both outward and homeward bound ships frequently make some stay, and squadrons of men-of-war rendezvous in time of war. It affords excellent anchorage, and is defended by the castles of Deal, Dover, and Sandwich, as well as by the Goodwin Sands.

DOW'RY (*douaire: Fr.*), the money or fortune which the wife brings her husband in marriage: it differs from *dower*.——DOWRY is also used, in a monastic sense, for a sum of money which is given with a female upon entering her in some religious order.

DOXOL'OGY (*doxologia:* from *doxa*, glory; and *logos*, a discourse: *Gr.*), in Christian worship, a hymn in praise of the Almighty. There is the greater and lesser doxology: the angelic hymn, 'Glory be to God on high,' &c., is the *greater* doxology; 'Glory be to the Father, and to the Son,' &c., the *less.*

DRACHM', or DRACH'ME' (*Gr.*), from *drassomai*, I grasp with the hand; and, therefore, literally, a handful), an ancient Greek coin of the value of ninepence three-farthings. It weighed 66·5 grains, and contained 65·4 grains pure silver. The drachma was originally, no doubt, a weight.——DRACHM is also a weight containing sixty grains, or the eighth part of an ounce. It is often written *dram.*

DRA'CO (*drakōn*, the dragon: *Gr.*), in Astronomy, a constellation in the northern hemisphere.

DRACON'IDÆ, a family of scaly reptiles found in India, distinguishable from the true lizards by having a broad membrane at each side of the body, supported by their six first false ribs. Thus a kind of wing is formed, by which, whilst leaping from branch to branch, the animal is assisted in its flight as by a parachute. But it has no power of rising in the air like a bat.

DRA'CO VO'LANS (a flying dragon: *Lat.*), a meteor in cold marshy countries, consisting of phosphuretted or carburetted hydrogen, which, under certain conditions, becomes luminous.

DRACUN'CULUS (a *dim.* of *draco*, a dragon: *Lat.*), in Botany, a species of *Arum*, a plant with a long stalk, spotted like the belly of a serpent.——DRACUNCULI, long slender worms, which breed in the muscular parts of the arms and legs. They are called *Guinea worms*, being common among the natives of Guinea. [See GUINEA WORM.]

DRAFT, in Commerce, a bill drawn by one person upon another, for a sum of money.——In Military affairs, the selecting or detaching of soldiers from an army or from a military post. Also, the act of *drawing* men to serve in the militia.

DRAG'OMAN (*targeman*, he has interpreted: *Arab.*), an interpreter in the East. The term is applied particularly to one whose office is to interpret for the European ambassadors at the Ottoman court.

DRAG'ON (*drakōn: Gr.*), a fabulous winged serpent, frequently mentioned in the romances of the middle ages.

DRAG'ON-FLY, the popular name of many species of neuropterous insects assigned by naturalists to several genera, *Libellula*, &c. Their elegant forms and bright colours render them beautiful objects on a sunny day. They deposit their eggs in water, and they continue in that element for the two years during which they remain in the larva and pupa state. According to Leuwenhoek there are more than 12,000 lenses in each eye of a dragon-fly.

DRAG'ONET, the *Callionymus Lyra*, an acanthopterygious fish with a slender body, coloured with yellow, blue, and white. It inhabits the Mediterranean and the German Ocean.

DRAGONNE'E (*Fr.*), in Heraldry, the term for a lion or other beast, whose upper half resembles a lion, &c., but the lower the hinder part of a dragon.

DRAG'ON'S-BLOOD, a resinous juice

obtained by incision from several plants found between the tropics, chiefly species of *Calamus*, plants belonging to the order of palms, and the Dragon's-blood Tree, *Dracæna Draco*, belonging to the order of *Liliaceæ*. It is opaque, of a deep reddish-brown colour, and brittle; and has a smooth and shining conchoidal fracture. Its taste is slightly astringent; and when burnt, it emits an odour somewhat like benzoin. It is employed chiefly for tingeing spirit and turpentine varnishes, for preparing gold lacquer, and for staining marble, to which it gives a red tinge. It was formerly in high repute as a medicine, but at present is very little used.

DRAG'ON'S HEAD, the *Dracocephalum*, a genus of plants with many species, most of them herbaceous.——DRAGON'S HEAD AND TAIL, the name given by astrologers to the points of the ecliptic plane crossed by the moon in its orbits, to the former of which they ascribe good fortune, and to the latter, bad.

DRAGOO'N (*dragon: Fr.*), a kind of light horseman, first employed in France. They were to fight either in or out of the line, in a body or singly, chiefly on horseback, but, if necessary, on foot also; but experience proving that they did not answer the end designed, they ceased to be used in infantry service, and now form a useful kind of cavalry, mounted on horses too heavy for the hussars and too light for the cuirassiers.

DRAM'A (literally a deed: *Gr*), the name of all compositions adapted for recitation and action on the stage, whether tragedy, comedy, opera, or farce, in which are displayed, for instruction and amusement, those passions, feelings, errors, and virtues of the human race, which are found in real life. The elements of the dramatic art are observed among all nations, and every people which has made progress in civilization has, at the same time, shown some taste for it. It is impossible to ascertain the exact period when theatrical amusements were first introduced into England; but they are mentioned as having existed very early by William Fitz-Stephen, a monk of Canterbury, in his *Descriptio nobilissimæ civitatis Lundoniæ*, written soon after the year 1170; and her success has been such, that she has produced the dramatic genius who has surpassed all ancient and modern writers in universality of conception and knowledge of human nature—our unrivalled Shakspere. In the beginning of the middle ages, when everything noble was buried under the deluge of barbarism, the dramatic art was lost, or existed only among the lower classes of the people, in plays improvised at certain festivals—for instance, at the carnival. These were attacked as heathenish, immoral, and indecent exhibitions; but the favour which they enjoyed among the people, and the spirit of the times, induced the clergy to encourage theatrical exhibitions founded on subjects from sacred history. These *Mysteries*, as they were at that time denominated, were followed by a species of the drama, styled *Moralities*, in which the senses, passions, affections, virtues, and vices were personified, and constituted the characters. As the moralities were contrived to entertain as well as instruct, some dawnings of poetry were soon exhibited, with occasional attempts at wit and humour, which naturally introduced *comedy*.

DRA'MATIS PERSO'NÆ (the characters in the play: *Lat.*), the characters represented in a drama.

DRA'PERY (*draperie: Fr.*), in Sculpture and Painting, the representation of the clothing of human figures; also hangings, tapestry, and curtains.

DRAS'TICS (*drastikos*, that which acts promptly: *Gr*), medicines which operate speedily and effectually.

DRAUGHT (*dragan*, to draw: *Sax.*), in Architecture, the delineation of any intended building, &c.——In Navigation, the depth of water necessary to float a vessel, or the depth to which a ship sinks when laden; as, a ship of ten feet draught.——DRAUGHTS, an amusing game played by two persons with twelve men on each side, on a chequered board like the chess-board.——DRAUGHT HOOKS, the iron hooks fixed on the cheeks of a cannon carriage, used in drawing the gun backwards and forwards.

DRAW'BACK, in Commerce, a term used to signify the remitting or paying back of the duties previously paid on a commodity, on its being exported, so that it may be sold in a foreign market on the same terms as if it had not been taxed at all. By this expedient, merchants are enabled to export commodities loaded at home with heavy duties, and to sell them abroad on the same terms as those brought from countries where they are not taxed.——In a popular sense, *drawback* signifies any loss of advantage or deduction from profit.

DRAW'ER, and DRAW'EE (*dragan*, to draw: *Sax.*), in Commerce, the *drawer* is he who draws a bill of exchange or an order for the payment of money; and the *drawee*, the person on whom it is drawn.

DRAW'ING (same *deriv.*), the art of representing the appearances of objects upon a flat surface, so as to exhibit their form and shadow, situation, distance, &c. [See PAINTING, PERSPECTIVE, &c.]

DREAM (*traum: Germ.*), a series of mental impressions occurring to a sleeping person, and which, therefore, are not under the command of reason. Dreams have been referred to various causes: among others, to direct impressions on the organs of sense during sleep; to the absence of a power to test the inaccurate conclusions drawn from one set of impressions by other impressions; to a disordered state of the digestive organs; to a less restrained action of the mental faculties; to the suspension of volition while the powers of sensation continue, &c. In health there is a less tendency to dream than in disease; in the earlier than in the later periods of life: and the very act of dreaming shows that the brain is not enjoying a complete state of rest. They have been frequently ascribed by the superstitious to supernatural agency, especially when there has been any coincidence between a dream and an external event.

DREDG'ING (*dragan*, to drag: *Sax.*), the process of catching oysters, by the removing or dragging mud with dredges, &c.——DREDGING-MACHINE, an engine used to take up mud or gravel from the bottom of rivers, docks, &c.

DRES'SINGS (*dresser*, to trim up: *Fr.*), in Architecture, mouldings round doors, windows, and the like.

DRIFT, a heap of any matter driven together; as, a drift of snow or sand.——DRIFT, in Mining, a passage cut under the earth, betwixt shaft and shaft, or turn and turn.——In Geology, a superficial deposit of fragments of rock frequently brought from a considerable distance, along with mud, sand, and clay.——DRIFT, in Navigation, the angle which the line of a ship's motion makes with the nearest meridian, when she drives with her side to the waves and is not governed by the helm.——DRIFT-SAIL, a sail used under water, veered out right ahead by sheets, as other sails are. It serves to keep the ship's head right upon the sea in a storm, and to hinder her driving too fast in a current.——A boat is also said to *drift*, or to go *adrift*, when it floats on the water without any one to row or steer it.

DRILL (*drillen*, to turn in a circle: *Ger.*), in Mechanics, a small instrument for making such holes as punches will not conveniently produce. Drills are of various sizes, and are used by smiths, turners, and machinists.——A dog-like baboon, the *Cynocephalus leucophæus* of naturalists. It is a native of Guinea.——TO DRILL, in a military sense, is to teach and train recruits to their duty by frequent exercise.——DRILLING, in Husbandry, a mode of putting seed into the ground by a machine called a *drill plough*, which makes channels in the ground and lets the seed into them, so that it comes up in rows, in which the plants are at regular distances from each other.

DROM'EDARY (*dromedarius: Lat.*; from *dromas: Gr.*) [See CAMEL.]

DRONE, the male of the honey-bee. It is larger than the working bee, but less than the queen bee. The drones make no honey: and, after living a few weeks, they are killed or driven from the hive.

DROP (*tropfen. Germ.*), a small portion of any fluid in a spherical form; as, a *drop* of water, a *drop* of laudanum, &c. In Pharmacy, 60 drops are equal to the quantity filling a teaspoon.——The part of a gallows which sustains a criminal before he is executed, and which suddenly *drops* after the rope is attached to his neck.——To *drop astern*, in seamen's language, is to slacken the velocity of a vessel to let another pass her.

DROP'SY (*hydrops: Lat.*; from *hudōr*, water: *Gr.*), in Medicine, an unnatural collection of watery humour, either throughout the whole body or in some part of it; as the cavity of the abdomen. It occurs most frequently in persons who are debilitated by disease. The dropsy takes different names, according to the part affected: as, *Ascites*, or dropsy of the abdomen; *Hydrocephalus*, dropsy of the brain or water in the head, &c.

DROS'ERA (*droseros: Gr.*), in Botany, a genus of herbaceous bog plants, nat. ord. *Droseraceæ*. They are of small size, and are found in various parts of the world, two species being natives of Britain. The leaves are furnished with glandulous hairs, which discharge a viscid juice. A drop of this is to be seen at the end of each hair during the hottest day. The hairs are irritable, and contract when touched.

DROSOM'ETER (*drosos*, dew; and *metron*, a measure: *Gr.*), an instrument for ascertaining the quantity of dew which falls. It consists of a balance, one end of which is furnished with a plate to receive the dew, the other containing a weight protected from it.

DROWN'ING (*druncnian*, to drown: *Sax.*). Death by drowning ensues from respiration having been stopped, and not from any water having got into the lungs, this being prevented by the glottis. If a man, unable to swim, falls into the water, he instinctively makes every exertion to escape from it; for a time he struggles, but at last becomes exhausted, and sinks. His agitation leads him to neglect obvious means of safety. The body, when the lungs are properly filled with air, is of less specific gravity than the water; and would, if the lungs were not exhausted by his struggles, easily float. Hence, if he were to lie quietly on his back, his mouth would be above water. The directions given by the London Humane Society for the treatment of persons in a state of suspended animation ought to be kept in every house, and known by every individual; and in all cases medical assistance should be immediately sent for. In the meantime, avoid all rough usage, and attend to the following *cautions* never hold the body up by the feet, nor roll it on casks; nor rub it with salts or spirits, nor inject tobacco-smoke or infusion of tobacco, but convey it carefully, with the head and shoulders supported in a raised position, to the nearest house; strip it and rub it dry; then wrap it in hot blankets, and place it in a warm bed, in a warm chamber, put bladders or bottles of hot water, or heated bricks, to the pit of the stomach and the soles of the feet, and foment the body with hot flannels; but if possible immerse it in a warm bath, as hot as the hand can bear without pain, as this is preferable to the other means of restoring warmth. Do not, however, suspend the use of the other means at the same time. These observations are recommended in the absence of a medical practitioner. The treatment recommended by the society is to be *persevered in* three or four hours; for it is a very erroneous opinion, that persons are irrecoverable because life does not soon make its appearance: though it must be confessed that, after an immersion of four or five minutes, the chances of recovery are very remote.

DRUG (*dreg: Sax.*), a general name for substances used in medicine, sold and frequently compounded by the druggists. It is also applied to dyeing materials.——In Commerce, any article lying on hand, or become unsaleable, is called a *drug*.

DRUG'GET (same *deriv.*, because light, as if dried up), a coarse woollen fabric, used for covering carpets, and sometimes as an article of clothing by females of the poorer classes.

DRU'IDS (*Druides* · *Lat.*), the priests of the ancient Britons and Gauls Cæsar is the first writer who tells us of the Druids They presided over religious observances and sacrifices, taught youth, decided controversies, chose a president by election, held a great meeting once a year, made great osier images, in which human beings were burned as sacrifices, had traditions about astronomy, the power of the gods, and the nature of things The younger Pliny added to this information that the mistletoe was a sacred plant with them, and that, clad in white robes, they cut it with a golden sickle, performing certain ceremonies The oak was their sacred tree, and they lived amongst groves of it. Hence he derives Druid from *drus*, the Greek for an oak Tacitus, in a famous passage, has described the invasion of Anglesea by Suetonius, when the Roman soldiers were met by Druids, who, with hands extended upwards, uttered awful prayers, and called down the vengeance of the gods When the island was conquered, the sacred groves were hewn down The connection of the Druids with altars and circles of stones, like Stonehenge, rests on nothing historical, for no ancient book contains anything to bring the two together. Notwithstanding the great number of volumes written about the Druids, very little is known about them beyond what is mentioned above, and in this age of investigation there are some who think that the whole subject is mythical, so obscure and indefinite is the information transmitted to us.

DRUM (*trummel* · *Germ*), a military musical instrument in the form of a cylinder, hollow within and covered at the ends with vellum, which is stretched or slackened at pleasure by means of small cords and sliding knots. It is beat upon with sticks Drums are sometimes made of brass, but commonly of wood. Kettle-drums are hollow hemispheres, and are used in pairs, one of them being tuned to the key note, and the other to the fifth of the key. There are several beats of the drum, as the *Chamade*, *Reveille*, *Retreat*, &c.——DRUM, in Architecture, the upper part of a cupola, usually below the dome; also the base of the Corinthian capital.——DRUM OF THE EAR, the hollow part of the ear, behind the membrane of the *tympanum*, which latter is a tense membrane closing the external passage of the ear, and receiving the vibrations of the air

DRUM'MOND'S LIGHT, the name given to the light produced by directing a stream of oxygen gas, passing through the flame of alcohol, upon a small ball of quick lime. It derives its name from its inventor.

DRUPE (*drupa*, an over ripe olive : *Lat*), in Botany, a succulent fruit, such as the cherry, plum, apricot, and date. The hard *endocarp*, forming the stone, and containing a single seed or kernel, is surrounded by the *mesocarp*, which is usually pulpy, but in the almond is of a rough texture. The *epicarp* forms the skin of the fruit. *Drupaceous* is an epithet applied to plants bearing drupes

DRUSE, in Mining, a cavity in a rock, having its interior surface studded with crystals or filled with water.

DRY'ADS (*Druas*, from *drus*, an oak : *Gr*), in the Heathen Mythology, deities or nymphs, which the ancients believed to inhabit groves and woods They differed from the *Hamadryads*, these latter being attached to some particular tree with which they were born, and with which they died; whereas the *Dryads* were goddesses of trees and woods in general

DRY-ROT, a minute fungus which grows in timber, decomposes its fibres, and produces rapid decay. *Dry-rot* is so called by architects in contradistinction only to the more usual circumstances of decay to which wood is liable Many methods have been proposed for rendering wood, and the various substances consisting of woody fibre, incapable of being affected by dry-rot the most effectual is the saturating them with a solution of corrosive sublimate

DU'AL (*dualis*, that contains two. *Lat*), a name given by Grammarians to a particular form of the nouns, to indicate that two of the things designated are referred to, the plural form referring to more than two The Greek language has a dual number

DU'ALISM (same *deriv*), the philosophical exposition of the nature of things by the adoption of two dissimilar primitive principles, not derived from each other It is the most striking feature in all the early Greek cosmogonies, and that which chiefly distinguishes them from the Oriental Among the ancients, the most eminent of those who maintained it were the Pythagoreans, and, among the moderns the followers of Descartes Those holding matter and spirit as distinct, in opposition to the materialists, are, in some sense, *dualists* ——In Theology, the Manichæan doctrine of two principles, the *good* and the *evil* Also, the high Calvinistic, which holds that all mankind are divided, by the arbitrary decree of God, into two classes, the *elect* and *reprobate*

DUC'AT (*ducato* *Ital*—because coined by dukes), a gold coin, coined in Austria, Denmark, Hamburg, Hanover, Prussia, Russia, and Sweden The values differ in the different states, ranging from 7*s* 6*d* to 9*s* 5*d*.

DU'CES TE'CUM (bring with thee *Lat*), in Law, a clause in a subpœna, commanding a person to bring with him to the trial of an action, books and papers which the party who issues the subpœna may think material to his purpose

DUCK'WEED or DUCK'S'-MEAT, the popular name of some plants growing in ditches and stagnant waters, and serving as food for ducks and geese. There are four species indigenous to Britain. They belong to the genus *Lemna*, nat. ord. *Pistiaceæ*.

DUCT (*ductus*, a leading : *Lat.*), in Medicine, any vessel or tube in the animal body by which the blood, chyle, lymph, &c., are carried from one part to another. Also, the vessels of plants in which the sap is conveyed.

DUCTIL'ITY (*ductilis*, capable of being drawn: *Lat.*), that property of metals which renders them capable of being extended by hammering, or of being drawn into wire without breaking. In general, ductility depends, to a greater or less extent, on temperature. Metals which, like zinc, are very ductile at one temperature, may be quite the contrary at another. The ductility of gold is very great: it may be reduced to a leaf only the 282,000th of an inch in thickness, and a particle of gold not exceeding the 500,000th of a grain in weight can be made distinctly visible to the naked eye. By drawing a compound wire, consisting of platinum covered externally with silver, and afterwards dissolving off the silver, Dr. Wollaston obtained a platinum wire only the 30,000th of an inch in diameter. When the diameter was only the 18,000th of an inch, it supported a weight of a grain and one-third.

DU'EL (*duellum*, a contest between two: *Lat.*), originally a combat between two persons, authorized by the law, for the discovery of the truth, but now a premeditated battle between two persons on some private quarrel, in which, if death ensue, both the principal and the seconds are guilty of murder.

DUEN'NA, the chief lady-in-waiting to the Queen of Spain. Also, an elderly woman, holding a middle rank between a governess and a companion, appointed to take charge of the younger ladies in Spanish families.

DUET, or DUET'TO (*Ital.*; from *duo*, two: *Lat.*), in Music, a song or piece for two performers.

DU'GONG, a cetaceous mammal, allied to the Manatee, and living in the Indian ocean, where it feeds on sea-weed. It is the *Halicore dugong* of naturalists.

DUKE (*dux*, a leader: *Lat.*), a sovereign prince in Germany, and the highest title of honour in England. His consort is called a *duchess*.——In England, among the Saxons, the commanders of armies, &c., were called dukes (*duces*), without any addition, till Edward III. made his son, the Black Prince, duke of Cornwall, after whom other dukes were made in the same manner, the title descending to their posterity. Duke, at present, is a mere title of dignity, without giving any domain, territory, or jurisdiction over the place from whence it is taken.

DULCAMA'RA (*dulcis*, sweet; and *amarus*, bitter: *Lat.*), the common *woody nightshade*. [See BITTER-SWEET.]

DUL'CIMER (*dulcis*, sweet: *Lat.*), a musical instrument, used by the Jews, but the nature of which is not known. Also, in more modern times, an instrument played by striking brass wires with small sticks.

DULOC'RACY (*doulokratia*: from *doulos*, a slave; and *kratos*, power: *Gr.*), a government in which slaves and the lowest order of the people have the power.

DULSE, the common name of an edible sea-weed, the *Rhodymenia palmata* of botanists.

DUMB'NESS (*stumm*, dumb: *Germ.*). The most general cause of this is the want of the sense of hearing. Sometimes, however, it arises from injury to the lingual nerves, or from general or local debility. The loss of hearing, though it happen in early life, after speech has once been attained, does not produce dumbness. Even the loss of the tongue does not altogether incapacitate from speaking. Great attention has been bestowed latterly on methods of instructing the dumb in the various arts and sciences, and even in languages, with great success; and such persons are now able not only to converse with facility by signs, but to devote themselves, as an amusement or means of support, to literature and science.

DUNES (*Ang. Sax.*), low hills of movable sand, very common in different parts of Great Britain, Ireland, and the Continent.——Fine sand, blown from the sea, accumulates when it meets with rocks, stumps of trees, or other obstacles. These hillocks, by the continual action of the same cause, are urged on, and their inroads often produce the most destructive effects. One department of France, the *Landes*, has been nearly overwhelmed by them. During violent hurricanes, their progress is so rapid, that they almost instantaneously cover entire villages, fields, and gardens. The best barriers against them are such trees and shrubs as are known to thrive in a barren soil: these both fix them and prevent any further encroachment of the sand.

DUN'NAGE, any loose or light material, such as wool, used as a bed in the stowage of heavy articles.

DUODE'CIMALS (*duodecimus*, the twelfth: *Lat.*), in Arithmetic, numbers proceeding from multiplications by twelve, in the same way as decimals proceed from multiplications by ten.——Also, a rule in Arithmetic, by which the contents of any surface or solid are found, by multiplying together its linear dimensions, expressed in feet, inches, and lines. It is much used by artificers, and is called likewise *cross-multiplication*.

DUODE'CIMO (*duodecim*, twelve: *Lat.*), abbreviated to 12*mo*, having or consisting of twelve leaves to a sheet; or a book in which a sheet is folded six times, so as to have twenty-four pages.

DUODE'NUM (*duodeni*, twelve each: *Lat.*), in Anatomy, the first of the small intestines in vertebrate animals, where the bile and the pancreatic juice are mixed with chyme. It received this name from the older anatomists, on account of their having remarked it to be, in some animals, of a length equal to about the breadth of *twelve fingers*: but this measure is generally inapplicable.

DU'PION (*doppio*, double: *Ital.*), a double cocoon, formed by two or more silkworms.

DU'PLE (*duplus*, double: *Lat.*), among mathematicians, an epithet applied to a ratio where the antecedent term is double the consequent: thus, the ratio of 8 to 4 is a duple ratio.——SUBDUPLE RATIO is just the reverse of the former, or as 1 to 2. Such is 4 to 8, or 6 to 12.

DU'PLICATE (*duplico*, I double: *Lat.*), a copy or transcript.——DUPLICATE PROPOR-

TION, or RATIO, is the proportion of the square of one number to the square of another.

DU'PLICATURE (same *deriv.*), in Anatomy, the fold of a membrane of a vessel.

DU'RA MA'TER (the hard mother: *Lat.*), in Anatomy, the membrane between the bones of the skull and the brain, and also dividing the latter into parts. The membranes of the brain were called *matres*, or mothers, by the older anatomists, because they supposed the other membranes to be derived from them.

DURAN'TE (*Lat.*), in Law, *during:* as *durante bene placito*, during pleasure; *durante minore ætate*, during minority; *durante vitâ*, during life.

DUR'BAR (*Ind.*), a court held by the governor-general, or by the native princes of India, on some state occasion.

DURESS' (*durities*, harshness: *Lat.*), in Law, restraint or compulsion; as where a person is wrongfully imprisoned, or deprived of his liberty contrary to law; or is threatened to be killed, wounded, or beaten, till he executes a deed or signs a writing intended to bind him. Any bond, deed, or other obligation, obtained under duress, will be void in law; and in an action brought on the execution of any such deed, the party may plead that it was obtained by duress.

DUTCH LIQ'UID (or chloride of hydrocarbon), a name for the mixture of chlorine and olefiant gas, which combine in equal measures even in the dark. It is a heavy oily liquid, with a sweetish taste.

DU'TY (*dû*, owed: *Fr.*), in Commerce, any tax or impost; a sum of money required by government to be paid on the importation, exportation, or consumption of goods.

DUUM'VIRI (*duo*, two; and *viri*, men: *Lat.*), in Roman Antiquity, a general appellation given to magistrates, commissioners, and officers, where two were joined together in the same function. The office, dignity, or government of two men thus associated, was called a *duumvirate.*——The *Duumviri capitales* were the judges in criminal causes. From their sentence it was lawful to appeal to the people, who alone had the power of condemning a citizen to death. The *Duumviri juri dicundo* were the highest magistrates in municipal towns. The *Duumviri perduellionis* were appointed to try those accused of *perduellio*, or treason. The *Duumviri municipales* were two magistrates in some cities of the empire, answering to the consuls at Rome; they were chosen out of the body of the *decuriones;* their office usually lasted five years, upon which account they were frequently termed *quinquennales magistratus.* The *Duumviri navales* were the commissaries of the fleet: the duty of their office consisted in issuing orders for the fitting of ships, and giving their commissions to the marine officers, &c. The *Duumviri sacri* were appointed for the purpose of building a temple when it was determined to erect one. The *Duumviri sacrorum* had the charge of the Sibylline books, afterwards committed to the *Decemviri.* The *Duumviri viis extra urbem purgandis* were officers who had charge of the streets outside the gates of Rome, &c.

DWARF (*dweoph: Sax.*), in general, an appellation given to things greatly inferior in size to that which is usual in their several kinds: thus, there are dwarfs of the human species, dwarf trees, &c. The Romans were so passionately fond of dwarfs, that they often used artificial methods to prevent the growth of boys designed for dwarfs, by enclosing them in boxes, or by the use of tight bandages.

DWARF'ING TREES. 'The art of dwarfing trees' (says Mr. Fortune), 'as commonly practised both in China and Japan, is, in reality, very simple. It is based upon one of the commonest principles of vegetable physiology. Anything which has a tendency to check or retard the flow of the sap in trees also prevents, to a certain extent, the formation of wood and leaves. This may be done by grafting, by confining the roots in a small space, by withholding water, by binding the branches, and in a hundred other ways, which all proceed upon the same principle. Stunted varieties are generally chosen, particularly if they have the side branches opposite or regular, for much depends upon this; a one-sided dwarf tree is of no value in the eyes of the Chinese or Japanese. The main stem is thus in most cases twisted in a zigzag form, which process checks the flow of the sap and at the same time encourages the production of side branches at those parts of the stem where they are most desired. The pots in which they are planted are narrow and shallow, so that they hold but a small quantity of soil compared with the wants of the plants, and no more water is given than is actually necessary to keep them alive. When new branches are in the act of formation they are tied down and twisted in various ways; the points of the leaders and strong growing ones are generally nipped off, and every means are taken to discourage the production of young shoots possessing any degree of vigour. Nature generally struggles against this treatment for a while, until her powers seem to be in a great measure exhausted, when she quietly yields to the power of Art. When plants from any cause become stunted or unhealthy, they almost invariably produce flowers and fruit. A bamboo, a fir, and a plum-tree, the last in full blossom, have been seen growing and thriving in a box only one inch square by three inches high.'

DY'EING (*deagan*, to colour: *Sax.*), the art of giving a lasting colour to silks, cloths, and other substances, by which their beauty is much improved, and their value enhanced. Dyeing, properly so called, is a chemical process; and, in order that it may succeed, it is necessary that the colouring matters should be dissolved in some fluid, and that their attraction to that fluid should be less than to the stuff. It is essential in dyeing to ascertain the affinities of the colouring substance: first, to the solvents; secondly, to those substances which modify its colour, increase its brilliancy, and strengthen its union with the stuff; thirdly, to the different agents which may change the colour, and principally to air and light In dyeing, the term *mordant* is applied to those matters which serve as intermedia between the colouring particles and the stuff to be dyed, either for the purpose of facilitating or of modifying their combination: by their means, also, colours are varied, brightened, and rendered more durable. The principal substances employed as mordants are aluminous salts, lime, metallic oxides, some astringent principles, and animal matters. Sometimes the mordant is printed on the cloth, and then, the whole cloth being dipped in the colouring matter and washed, the colour will be removed, except where the mordant has been placed. Sometimes the mordant is intended to resist the colour, in which case the colour will be removed in the washing wherever the mordant has touched, and there will be a white pattern on a coloured ground. Sometimes the mordant and pattern are printed on together, and rendered permanent by exposing the goods to steam. Sometimes the substance put on by the block destroys the colour after the cloth has been dyed uniformly throughout. The three simple colours used in dyeing are red, yellow, and blue; all other colours are compounded of these. The ancient Egyptians practised the art of dyeing with some degree of scientific precision; but the Tyrians were those who made it the staple of their commerce; and there is little doubt that purple, the symbol of royal and sacerdotal dignity, was a colour discovered in Tyre, and instrumental in raising that city to opulence and grandeur. The moderns have obtained from the New World several dye-drugs unknown to the ancients, such as cochineal, Brazil wood, logwood, annotto, &c.; but the vast superiority of our dyes over those of former times must be ascribed principally to the employment of pure alum and solution of tin as mordants—substances which give to our common dye-stuffs remarkable depth, durability, and lustre. One of the most important improvements in the art of dyeing is the recent discovery of the beautiful *aniline* colours obtained from coal tar.

DYNAM'ETER (*dunamis*, force; and *metron*, a measure: *Gr.*), an instrument for determining the magnifying power of telescopes.

DYNAM'ICS (*dunamikos*, powerful: *Gr.*), the doctrine of power; but, as this is known to us only by its effects, that is, by the motion it produces on the body upon which it acts, and it is measured by that motion, dynamics may be defined to be 'the science which treats of the motion of bodies.' It is often restricted to the motion of those which are at liberty to obey the impulse communicated to them; in which case, the motion of a stone falling freely to the ground, or of a heavenly body moving in its orbit, would belong to *dynamics*; but the motion of a body moving along an inclined plane, to *mechanics*. Dynamics, however, and statics, are often, and not incorrectly, considered as branches of the general science of *mechanics*. A knowledge of the principles of dynamics is due to the moderns, having had its commencement in the researches of Galileo: before his time, the forces which act on bodies were examined only in the cases in which equilibrium is produced.

DYNAMOM'ETER (*dunamis*, force; and *metron*, a measure: *Gr*), an instrument for measuring and recording the energy exerted by an effort

DY'NASTY (*dunasteia*, from *dunastes*, a chieftain: *Gr.*), a race or series of princes who have reigned successively in any kingdom; as the *dynasties* of Egypt and Persia.

DYS'CRASY (*duskrasia*: from *dus*, difficult; and *krasis*, a blending: *Gr.*), in Medicine, an ill habit or vitiated state of the humours.

DYS'ENTERY (*dusenteria*: from *dus*, difficult; and *enteron*, an intestine: *Gr.*), in Medicine, a disease in which blood, mucus, and other morbid matter, are evacuated, accompanied with griping of the bowels, &c.

DYS'ODILE (*dusōdēs*, stinking: *Gr*), a species of coal of a greenish or yellowish grey colour, in masses composed of thin layers. Its odour when burning is very fœtid.

DYS'OREXY (*dus*, bad; and *orexis*, a yearning after anything: *Gr.*), in Medicine, a bad or depraved appetite.

DYSPEP'SIA, or DYSPEP'SY (*dus*, bad; and *pepsis*, digestion: *Gr.*), in Medicine, difficulty of digestion. Hence those who are afflicted with indigestion are termed *dyspeptic* persons. The disorder of the digestive function is the most frequent and prevailing of the ailments that afflict man in the civilized state; all classes and all ages suffer from its attacks. The symptoms of dyspepsia are very different in different circumstances. The epicure loses his relish for the most refined dishes: becomes bloated, heavy, and probably apoplectic. The fashionable lady suffers from headaches, flatulence, occasional giddiness, and dimness of sight; she becomes indolent, whimsical, and full of fancies; or, as the old physicians would say, she has the *vapours*. The studious man finds his mind blunted, loses his appetite or does not enjoy his meals; sleeps badly, dreams much, and becomes capricious and dissatisfied with himself and everybody else: he is a *hypochondriac*. The humbler classes drink gin or rum for a stimulant, which soon becomes a necessity; and as its effect diminishes, the dose is increased, until at last they become tipplers, or perhaps confirmed drunkards The nature of the case must, in a great degree, suggest the remedy. It is one of the most painful diseases; but, with a little energy and perseverance, it is almost certain to be removed. When the man advanced in years does not find the energetic appetite of his youth, when the studious man does not possess the appetite derived from active employment, each merely discovers what nature herself points out—that he does not require so large a supply of food as he might in other circumstances; and if, by provocatives, he forces himself to eat what nature tells him he is unable to digest, he must take the consequences. Some kinds of food are naturally hard to be digested: some kinds are indigestible in certain circumstances, and by certain constitutions; but in the great majority of cases the evil arises, not so much from the *quality* as the *quantity* of what is taken. As to the use of bitters, or those other means of improving a weak stomach, their effect is but temporary; in most cases, the remedy will ultimately lose its effect, and in many it will produce evils as bad as, or worse than, those it is intended to remove. *Abstinence* is the great cure for dyspepsia; moderation and healthful exercise are its preventives.

DYSPHA'GIA (*dus*, difficult; and *phago*, I eat: *Gr.*), in Medicine, a difficulty of swallowing, which arises from paralysis, enlarged tonsils, &c.

DYS'PHONY (*dus*, difficult; and *phōnē*, a voice: *Gr*), in Medicine, a difficulty of speaking, occasioned by imperfection in the organs of speech.

DYSPNŒ'A (*dus*, difficult; and *pneo*, I breathe: *Gr.*), in Medicine, a difficulty of breathing.

DYS'URY (*dusouria*: from *dus*, difficult; and *ouron*, urine: *Gr.*), in Medicine, difficulty of voiding the urine, attended with pain and a sensation of heat.

E

E, the fifth letter in the Hebrew alphabet, and languages derived from it, is the second vowel, and has different pronunciations in most languages. The French have their *e* open, *e* masculine, and *e* feminine or mute. In English the letter has two sounds: long, as in *here, mere, me*; and short, as in *wet, kept*, &c. As a final letter it is generally quiescent; but it serves to lengthen the sound of the preceding vowel, as in *mane, cane, thine*, which without the final *e* would be pronounced *man, can, thin*. In many other words the final *e* is silent, as in *examine, definite*, &c. In sea charts, E. stands for *east*: thus, E. by N. *East* by *North*; E by S. *East* by *South*. As an abbreviation, it is put for *engineers*, as R E. *Royal Engineers*; for *empire*, as H R E. *Holy Roman Empire*; for *eminence* and *excellency*, as H E. *His Eminence* (a title of cardinals), or *His Excellency*, a title given to governors of colonies and to ambassadors; for *exempli*, as *e g. exempli gratia* (for instance), &c In Music, it is the third note or degree of the diatonic scale, corresponding with *mi* of the French and Italians. As a numeral, E stands for 250.

E'AGLE (*aigle*: *Fr*), the name of several rapacious birds of the family *Falconidæ*. The largest is the imperial eagle (*Thrasaëtus harpyia*), a native of Mexico, which measures three feet and a half from the tip of the bill to the end of the tail; and the next, the golden eagle (*Aquila chrysaëtos*), the largest of the European kinds, and a native of Britain, its length being three feet three inches. Most of the species are noble birds. The talons and bill of the eagle are strong and terrible; its vision is keen, and it can distinguish objects at a great distance. It lives to a great age. Among the ancients, the eagle was held sacred to Jupiter: it was placed on his sceptre, as the carrier of the lightning, and thus became expressive of superior dominion. In this sense it is used as the symbol of nations, princes, and armies. The eagle was first used as a military standard by the Persians. Among the Romans, it was either of gold, silver, or bronze, borne singly on the point of a staff; but from the time of Constantine, when the empire became divided into the eastern and western, it was represented with two heads. During the sway of Napoleon, the French took for their standard an eagle with folded wings.——EAGLE, in Heraldry, one of the most noble bearings, and which, according to the learned in that science, ought to be given to none but such as greatly excel in courage and magnanimity. It is assumed by sovereigns as the badge of empire. The eagle of Russia is *or*, with two heads displayed *sable*, each ducally crowned of the field; the whole imperially crowned, beaked, and membered, *gules*. The eagle of Austria is also displayed, with two heads; the Prussian eagle has but one. The Americans have selected the bald eagle of their continent, a selection made by Benjamin Franklin. The eagle is also the badge of several orders, as the Black Eagle and the Red Eagle of Prussia, the White Eagle of Poland, &c.——EAGLE, a gold coin of the United States, value 2*l*. 3*s*. 10*d*. sterling.

E'AGLE STONE, a term applied by the old pharmaceutists to globular clay ironstone. The specimens vary in size from a walnut to a man's head, are of a spherical or oval shape, have a rough surface, and are essentially composed of concentric layers. In the centre is generally a kernel or nucleus, sometimes movable, and always differing from the exterior in colour and density. The ancients gave them the name of eagle-stones, from an idea that the eagle carried them to her nest to facilitate the laying of her eggs.

E'AGLET, a diminutive of *eagle*, properly signifying a young eagle.——In Heraldry, when there are several eagles on the same escutcheon, they are termed *eaglets*.

E'AGLE-WOOD. [See ALOES-WOOD.]

EAR (*eare*: *Sax.*), the organ of hearing, consisting externally of a cartilaginous body, the *concha*, attached to each side of the head. This collects the undulations of the air constituting sound, and conveys them to the external auditory passage, at the bottom of which a membranous partition, the *tympanum*, stretches across a cavity containing four little bones, named *malleus*, *incus*, *stapes*, and *os orbiculare*. These are articulated together A bony partition, perforated by two small holes, one covered by a membrane, and the other closed by the *stapes*, separates the tympanic cavity from the internal ear or labyrinth, a cavity in the temporal bone. The labyrinth is chiefly composed of the three *semicircular canals*; and the *cochlea*, an organ resembling in shape the spiral shell of a snail. A limpid fluid fills these parts, and the nerves of hearing are suspended in it ——EAR, in Music, that internal sense by which we perceive and judge of harmony, and distinguish musical sounds.——EAR, among gardeners, a name given to the cotyledonous leaves which first appear from the seed, and usually differ in form from the subsequent perfect leaves.

EAR'ING, in seamen's language, a small rope employed to fasten the upper corner of a sail to its yard, &c

EAR'-MARK originally signified a cut in the ear by which a sheep could be recognized, but it has been extended to a mark on any object by which it may be identified

EARL (*eorl: Sax.*), a British title of nobility, between a marquis and a viscount; now the third degree of rank. William the Conqueror first made this title hereditary, giving it in fee to his nobles, and allotting them for the support of their state the third penny out of the sheriff's court, from all pleas of the shire whence they had their title. At present the title is accompanied by no territory, or private or judicial rights, but confers nobility, and an hereditary seat in the House of Lords. In official instruments, earls are styled by the sovereign 'trusty and well-beloved cousins,' an appellation as ancient as the reign of Henry IV For some time after the Norman conquest they were called *counts*, and their wives to the present day are styled *countesses*. The earl's coronet has no flowers raised above the circle, like that of a duke and a marquis, but only points, and a pearl on each of them

EARL MAR'SHAL OF ENGLAND, a great officer who had anciently several courts under his jurisdiction, and among them the *court of chivalry*, or *court of honour*. Under him is the herald's office, or college of arms. He is an earl *ex officio*. The first Earl Marshal on record was appointed in 1135. Since 1483 it has been in the Howard family, and has been made hereditary in the heirs male of the eighth Duke of Norfolk, whose descendant, the present duke, now holds it.

EARN'EST, in Commercial law, money advanced by the buyer of goods, to bind the seller to the performance of a verbal bargain.

EARTH, in Astronomy and Geography, one of the primary planets, the terraqueous globe which we inhabit. In remote antiquity, the earth was regarded as a flat, circular body, floating on the water; but the great distances which men were able to travel soon refuted this limited idea as an optical illusion, and the spherical form of the earth was consequently suspected. According to the Ptolemaic system, it was supposed to be immovable in the centre of the universe; but, according to that of Copernicus, it moves from west to east, so as to occasion the succession of day and night, and also annually round the sun, so as to cause the different seasons. By some of the ancients its form was supposed to be like that of an oblong cylinder; by others, like that of a drum; and by others it was supposed to be a plane surface. Succeeding ages have, however, demonstrated it to be nearly spherical; and among other reasons for this theory are the following:—1. All the appearances of the heavens, both on land and at sea, are the same as they would be if the earth were a globe. 2 In eclipses of the moon, which are caused by the shadow of the earth falling upon the moon, this shadow is always circular, and a body can be no other than a globe which, in all situations, casts a circular shadow. 3 Several navigators have sailed quite round the globe, steering their course directly south and west till they came to the Magellanic sea, and from thence to the north and west, till they returned to their port from the east; and all the phenomena which should naturally arise from the earth's rotundity happened to them. It is true, the surface of the earth is not an exact geometrical globe; but then the inequalities are so inconsiderable that the highest mountain bears no greater proportion to the bulk of the earth than a grain of dust does to a common globe. The figure of the earth was believed by mathematicians and geographers to be perfectly spherical, excepting the small inequalities in its surface, of mountains and valleys, until Sir Isaac Newton and Huygens demonstrated from the laws of hydrostatics, and the revolution of the earth about its axis, that its figure is not a true sphere, but an oblate spheroid flattened towards the poles Various measurements have since put this beyond all doubt. There are abundant proofs that the earth, since it has assumed its present form, has undergone many great revolutions. Shells and corals are found in the interior of continents, and on the summits of the highest mountains; which, therefore, must have been at some period beneath the sea. The remains of tropical animals and plants are found in high latitudes Mineral strata are twisted, dislocated, and broken asunder. As to the structure of the crust of the globe, see GEOLOGY. The earth's equatorial diameter is rather more than 7,925½ English miles; its polar, rather more than 7,899 miles; the polar compression is, therefore, not quite 26½ miles, and the proportion of one diameter to the other is as 299 to 298. Its mean radius is 3,956⅛ miles; its circumference, 25,000; its superficies, 198,944,200 square miles; and its solidity, 263,930,000,000 cubic miles. The mass of the earth, compared with that of the sun, is as 1 to 355,000; and its mean density is to that of water as 5½ to 1. The *interior* of the earth is almost entirely unknown to us, as the depth to which we have been able to penetrate is nothing in comparison with its diameter. The earth has a triple motion. There is a *diurnal motion* round its own axis, from west to east, in 24 hours, which occasions the per petual succession of days and nights. The time of the earth's revolution on its axis, called the *sidereal day,* is measured by the interval between two transits of the same fixed star over the meridian of any place; and astronomers have proved that this interval cannot have altered so much as three times the thousandth part of a second during the last 2000 years. There is an *annual motion* round the sun in a year, which produces the different seasons, and the lengthening and shortening of days. This motion is performed in an elliptical orbit, the excentricity of which, or the distance of the foci from the centre, is 0·01679 parts of the mean distance of the earth from the sun—that is, of 95 millions of miles. The motion of the earth in its orbit is not uniform, being most rapid at its *perihelion,* and slowest at its *aphelion.* Its average velocity is 68,040 miles an hour. The inequality of the earth's angular motion about the sun causes the *apparent solar day,* or the interval between the successive transits of the sun over the same meridian, to be unequal, and not to correspond with the length of the *mean solar day.* The third motion is caused as follows. The equator of the earth is inclined to the plane of its orbit, called the *plane of the ecliptic,* at an angle of 23° 27′ 56″: this inclination is termed the *obliquity of the ecliptic,* and causes the phenomena of the seasons. Since the earth's axis always preserves its parallelism (that is, points to the same star), the sun, at one season of the year, is 23° 27′ 56″ to the north of the equator, and at the opposite season the same distance to the south of it; but the straight line formed by the intersection of the planes of the equator and ecliptic has a slow motion westward, contrary to the order of the signs, and retreats at the rate of 50·1″ yearly, causing what is termed the *precession of the equinoxes,* or, more correctly, the *retrogression of the earth's nodes.* This is due to the disturbing action of the sun and moon on the redundant matter at the equator of the earth, by which its figure is rendered oblate; and this precession, jointly with the nutation of the earth's axis, causes a motion of its poles about the poles of the ecliptic. The sun appears to return to the equator before the completion of the sidereal year, by the amount of time which the sun, or rather the earth, requires to pass over 50·1″, that is, 20′ 19·9″. A complete tour of the ecliptic is performed in 25,868 years. The revolution of the seasons forms the *equinoctial* or *tropical year.* The discovery of the motion of the earth has become memorable in the history of the human mind, showing, as it does, a marked ability in man to resist the impressions produced by appearances, and to believe the contrary of that which had been believed and taught for many centuries. It was also a triumph over the assumption of an infallible authority. Galileo was imprisoned for holding the very doctrines now maintained universally by mankind; and he was obliged, under the threat of most terrible punishment, to recant, as heretical, his teachings regarding a system of the world, the correctness of which is now unquestionable. The invention of the telescope, by means of which the rotation of Jupiter was soon observed, but still more Newton's discovery of universal gravitation, and the nature of the celestial motions, led to the accurate knowledge regarding the solar system at which we have arrived.

EARTH-EAT'ING is a habit which individuals amongst some savage peoples possess, the morbid craving arising probably from the meagreness of their ordinary diet. Humboldt has described the habit as witnessed by him amongst the Otomacs of the Orinoco. On the upper parts of the Amazon it is by no means uncommon, not only amongst the Indians, but the negroes and whites.

EARTH'-NUT, a name given to various subterranean vegetable products. It is applied in England to the nut of the *Bunium flexuosum,* an umbelliferous plant; in China and the western coast of Africa, to the pods of the *Arachis hypogœa,* a leguminous plant; and, in other countries, to the small tubers of cyperaceous plants.

EARTH'ENWARE, or POTTERY. [See CHINA WARE.]

EARTH'ING, in Agriculture and Gardening, the covering of shrubs and plants, as vines, celery, &c., with earth.

EARTH'QUAKES are waves of elastic compression travelling through a portion of the crust of the globe, and originating in an impulse in the interior. 'That impulse (says Mr. Mallet) may be an explosive production or condensation of high pressure steam in heated cavities deep beneath the surface, or sudden increase or decrease of its tension, or sudden fracture or fall, or forcing up or down or against each other of great rocky masses, or if in near propinquity to active volcanoes, it may be any of their throbs or throes, or explosive ejections, or the recoil from these.' The rate of movement of the wave thus generated varies with the elasticity of the medium through which it is propagated, the rate being less at sea than on land, and less in loose strata than in compact rock. An earthquake wave has been found in some cases to travel at the rate of thirty miles a minute. When the impulse originates under the sea, a large volume of water is forced upwards, and a wave is propagated in all directions, which, when it reaches a shore, rushes upon it with violence, frequently causing great destruction. Very large tracts of ground are sometimes shaken. At the fearful earthquake which destroyed a great part of Lisbon in 1755, a portion of the earth's surface four times larger than Europe was shaken. In the Andes the earth has sometimes continued to tremble without interruption for many days together; and at other places there have been tremblings felt almost hourly for many successive months. Permanent alterations of the level of large tracts of ground, both elevations and depressions, have followed earthquakes. Noises very frequently but not always accompany earthquakes. The connection of earthquakes and volcanoes has been often noticed, so much so that the latter have been termed safety valves for the country in their neighbourhood. The immediate cause of earthquakes is still involved in great obscurity, and various theories have been proposed to embrace all the phenomena displayed. The destruction of life by earthquakes has often been very large. Although there is a strong tendency on such occasions to exaggerate the loss of life, it may well be that in the course of a few thousand years some millions of human beings have been destroyed

EARTHS (*erde: Ger*), in a popular sense, those solid bodies composing the mineral strata, which are incombustible, colourless, not convertible into metals by any ordinary methods of reduction, and, when reduced by scientific experiments, possessing generally but an evanescent metallic existence. But, to describe *earths* according to the rules of chemical science, we should say that they are tasteless, inodorous, uninflammable substances, usually occurring in intimate union with each other, with various acids, and with oxides of the common metals. Under these circumstances, they constitute by far the greatest part of the strata, gravel, and soil, forming the mountains, plains, and valleys of our globe Their number is ten. Five of them possess decided alkaline properties—*baryta*, *strontia*, *lime* (*calcia*), *magnesia*, and *lithia* Five of them are termed earths proper—*alumina*, *glucina*, *yttria*, *zirconia*, and *thorina*, these do not change the infusion of cabbage or tincture of litmus, do not readily neutralize acidity, and are insoluble in water. The earths were regarded as simple bodies until the brilliant researches of Sir H Davy proved them to be compounds of oxygen with peculiar bases

EAR'-TRUMPET, an instrument used by persons partially deaf, to strengthen the sensation of sound, by collecting and conducting it through a funnel-shaped tube to the seat of the sense of hearing

EAR'WIG, the common name of some orthopterous insects, of which the *Forficula auricularia* is the best known The English and French name, *perce-oreille*, is founded on a popular error that these insects enter the human ear, and there commit serious injury. These insects are remarkable for the forceps at the end of the abdomen, and for the singular structure of the wings, which, although little used, are of large size. They are of delicate texture, and fold up like a fan into a very small compass.

E'ASEL (*esel*, an ass *Ger.*), a wooden frame on which a painter sets the cloth, &c., to be painted.——**EASEL-PIECES**, such pieces as are painted on easels, in distinction from those painted on ceilings, &c.

E'ASEMENT (*aisement: Fr*), in Law, a privilege or convenience which one man has upon another man's land, such as a right of way.

E'ASING (*aisant: Fr.*), in sea language, the slackening a rope, &c ; thus, to ease the bowline or sheet, is to let them go slacker; to ease the helm, is to let the ship go more before the wind, or more larboard.

EAST (*Ost: Ger.*), one of the four cardinal points, being that point of the horizon where the sun appears to rise when in the equator. The word *east* is indefinitely used when we speak of countries which lie eastward of us, as Persia, India, China, &c. ——In Christian churches, which are generally built east and west, the chancel stands at the east end, with an emblematic reference to Christ, who is called the Son of Righteousness and the Day-spring.

E'ASTER (*ostern: Ger.*), a solemn festival observed among Christians, in commemoration of Christ's resurrection. The Greeks and Latins call it *pascha*, a Hebrew word, applied to the Jewish feast of the passover, to which the Christian festival of Easter corresponds. Thus, St. Paul says (1 Cor. v. 7), 'For even Christ our passover is sacrificed for us.' This feast was fixed by the council of Nice, in the year 325, to be held on the Sunday which falls upon or immediately after the full moon which happens next after the twenty-first of March; and as such it stands in the rubric of the church of England. The new moons of the ecclesiastical calendar, by which Easter is regulated, are determined arbitrarily, by the lunar cycle in the Julian calendar, and the table of epacts in the Gregorian The new moons of the calendar are generally one, two, or even three days later than the astronomical or *true* new moons And the 14th day of the moon is counted *full* moon, though the *opposition* more usually occurs on the 16th.

E'ASTER-OF'FERINGS, or **EASTER-DUES**, small sums of money sometimes paid to a parochial clergyman by the parishioners.

E'ASTERLING (*österlich*, eastern · *Ger.*). The silver penny was at first called by this name, from which *sterling*, as applied to English money, is supposed to have been derived The Baltic and German traders, who visited London in the middle ages, were called *Easterlings;* and their name may have been given to this coin, from some of their nation having been employed to coin it

EAST-IN'DIA COM'PANY,—'the Governor and Company of Merchants of London trading to the East Indies,'—the most celebrated commercial association either of ancient or modern times It was incorporated about the 42nd of Queen Elizabeth, A.D 1600, and empowered to trade to countries to the eastward of the Cape of Good Hope, exclusive of all other persons. A variety of causes had been long operating in favour of such an incorporation; and several very valuable East India ships which had been taken from the Portuguese and Spaniards by the English fleets, awakened a desire in our merchants to obtain a share in a traffic which promised such great advantages. At length, in 1593, an armament fitted out for the East Indies by Sir Walter Raleigh, and commanded by Sir John Borroughs, fell in, near the Azores, with the largest of all the Portuguese carracks, a ship of 1600 tons burden, carrying 700 men and 36 brass cannon; and, after an obstinate conflict, carried her into Dartmouth. She was the largest vessel that had been seen in England, and her cargo, consisting of gold, spices, calicoes, silks, pearls, drugs, porcelain, ivory

&c., excited the ardour of the English to engage in so lucrative a commerce. About the year 1698, application being made to parliament by private merchants, for laying this trade open, an act passed empowering every subject of England, upon raising a sum of money for the supply of the government, to trade to those parts. A great subscription was accordingly raised, and the subscribers were styled the New East-India Company; but the old establishment being in possession of all the forts on the coast of India, the new one found it its interest to unite with it; and both, trading with one joint stock, have ever since been known under one name, viz. *The United East-India Company*. Many and severe have been the contests between the advocates of a free trade to India and the friends of the 'incorporated company;' but at length the long-supported monopoly of that powerful body yielded to the act 3 and 4 Will. IV. c. 85, for continuing the charter till 1854, which, in fact, put a limit to the Company's commercial character, by enacting that its trade to China was to cease on the 22nd of April, 1834, and that the Company was, as soon as possible after that date, to dispose of its stocks on hand, and close its commercial business. All the real and personal property belonging to the Company on the 22nd of April, 1834, was vested in the crown, to be held or managed by the Company in trust for the same; subject to all claims, debts, contracts, &c., already existing or to be hereafter incurred by a competent authority. The Company's debts and liabilities were to be all charged on India; the dividend, which was to continue at 10½ per cent., was to be paid in England out of the revenues of India, but it might be redeemed any time after April 1874, or, should the Company be deprived of the government of India in 1854, any time after that event, on payment of 200*l.* for 100*l.* stock. The functions of the East-India Company became, therefore, wholly political, and even these functions have now ceased. The affairs of our Indian empire are now managed by a Secretary of State, assisted by fifteen councillors, and two under secretaries. The East-India Company's territories were immense: they were greater than those of either Russia or Austria, being inferior only to those of Great Britain and France. The revenue of India, which now exceeds the expenditure, is upwards of forty-five millions sterling.

EAU DE COLOGN'E (Cologne water: *Fr.*), an aromatic spirit, made originally at Cologne. It is chiefly used as a perfume; though numberless imaginary medicinal virtues have been ascribed to it. A good imitation of it may be made by mixing one pint of alcohol, one drachm each of the oils of bergamot, orange-peel, and rosemary, one drachm of bruised cardamom seeds, one pint of orange-flower water, and distilling one pint from a water bath.

EAU DE LUCE, a strong solution of ammonia, scented by adding a little mastic and oil of amber. It is considered, in India, an effective remedy against the bite of poisonous snakes.

EAVES (*eaux: Fr.*), the edges of the roof of a house, which overhang the wall, for the purpose of throwing the water to a distance from it.

E'AVES-DROPPER, one who skulks under the eaves of houses, for the purpose of listening to what passes within.

EBB (*ebbe: Ger.*), the retirement or reflux of the tide.

EB'ONY (*ebenos: Ger.*), a hard, heavy, durable black wood, which admits of a fine polish: obtained from various species of *Diospyros*, nat. ord. *Ebenaceæ*, trees which grow in India, Madagascar, Ceylon, and the Mauritius. It is wrought into toys, and used for mosaic and inlaid work. Ironwood belongs to the same genus.

EBOU'LEMENT (*Fr.*), in Fortification, the crumbling or falling away of a wall or rampart.

EBRAC'TEATE (*e*, privative; and *bractea*, a thin leaf: *Lat.*), in Botany, without a bractea or floral leaf.

EBULLI'TION (*ebullio*, I bubble up: *Lat.*), either the operation of boiling, or the effervescence which arises from the mixture of an acid with an alkaline liquor.

ECAU'DATE (*e*, privative; and *cauda*, a tail: *Lat.*), an epithet for anything which has no tail or spur.

EC'BASIS (*ekbasis*, an issue of a matter: *Gr.*), in Rhetoric, those parts of the proœmium in which the orator treats of things according to their events or consequences.

EC'BOLE (*ekbolē*, a going out: *Gr.*), in Rhetoric, a digression by which the orator introduces some other person speaking in his own words.

EC'CE HO'MO ('Behold the man!' *Lat.*), in Art, a picture or piece of sculpture, which represents Christ crowned with thorns The name was suggested by Pilate's exclamation, John xix. 5.

ECCEN'TRIC or EXCEN'TRIC (*ekkentros*: *ek*, away from; and *kentron*, the centre: *Gr.*), in Geometry, a term applied to circles and spheres which have not the same centre, and consequently are not concentric. ——In Ancient Astronomy, the *deferent* circle, in the circumference of which the centre of the *epicycle* of a planet is supposed to be carried forward in its orbit round the earth. It was excentric with regard to the earth; for though the orbit of a planet was believed to be a circle described about the earth, the latter was not placed in the centre of that circle.——EXCENTRIC ANOMALY, the arc of the excentric circle, between the perihelion of the orbit, and a straight line drawn through the centre of the planet, perpendicular to the major axis.——EXCENTRIC CIRCLE, in Ancient Astronomy, the circle that circumscribes the orbit of a planet.——An ECCENTRIC, in Machinery, is a circular disc, attached to a shaft in such a manner that its centre does not coincide with the axis of the shaft. It is of great use when a reciprocating motion is required to be given to a rod.

ECCENTRIC'ITY or EXCENTRIC'ITY (same *deriv.*), in Astronomy, the distance between the focus and centre of the elliptic orbit of a planet or satellite, the semi-axis major being considered as unity; or the ratio of the distance between the focus and centre to the semi-axis major.

ECCHYMO'SIS (*Gr.*), from *enchumo*, I pour in), in Medicine, an appearance of livid spots on the skin, occasioned by an extravasation of blood from a vein betwixt the flesh and the skin.

ECCLESIAS'TES (a preacher: *Gr.*), a canonical book of the Old Testament, the design of which is to show the vanity of all sublunary things. The majority of commentators believe this book to be the fruit of Solomon's repentance, after having experienced all the follies and pleasures of life.

ECCLESIAS'TIC (*ekklesiastikos*, belonging to the church; from *ekklesia*, the church: *Gr.*), a person in orders: one who is consecrated to the service of the church and the ministry of religion.

ECCLESIAS'TICUS (same *deriv.*), an apocryphal book of Scripture, considered by the Roman Catholic church as canonical. It is so called from its being read in the Jewish church as a book of piety and instruction, but not of infallible authority. Its author was a Jew, called Jesus the son of Sirach. The Greeks call it *the wisdom of the son of Sirach*. It exhibits but little regard for methodical arrangement, but it is highly poetical

ECCLE'SIOLOGY (*ecclesia*, and *logos*, a discourse: *Gr.*), that branch of knowledge which is concerned with the structure of churches, ancient and modern, their various parts and contents.

E'CHELON (a step: *Fr*), a term in military tactics borrowed from the French, signifying the position of an army with one division more advanced than another, somewhat like the steps of a ladder. A battalion, regiment, &c, marches *en échelon* if the divisions of which it is composed do not march in one line, but on parallel lines The divisions are not exactly behind each other, but each is to the right or left of the one preceding, so as to give the whole the appearance of a stairway This order is used if the commander wishes to bring one part of a mass into action, and to reserve the other.

ECHI'NATE or ECHI'NATED (*echinos*, a hedgehog: *Gr.*), a term applied to whatever is armed with large spines.——In Botany, an epithet for the seeds of plants that are rough and prickly; also for the pericarp of some plants

ECHI'NITES (same *deriv*), fossil *Echini*, and radiate animals of allied genera. They abound in the chalk.

ECHI'NODERMS (*echinos*, a hedgehog; *derma*, skin: *Gr.*), a class of radiate animals, including sea-urchins, star-fishes, and some worm-like animals in which the radiate structure is only slightly displayed.

ECH'INUS (a sea-urchin: *Lat.*; from *echinos*: *Gr.*), the name of a genus of sea-urchins or sea-eggs, belonging to the echinodermatous class. They have a subglobose shell, or test, composed of calcareous plates, some of which bear tubercles, forming the sockets on which the spines move; whilst others are perforated with small holes in rows through which fleshy cirri, the organs of locomotion, are thrust at the will of the animal. The vent is placed at the middle of the upper part, over against the mouth on the under side. The dental apparatus is large and remarkably elaborate. It was formerly styled Aristotle's lantern. Some species of Echinus form an article of human food on the shores of the Mediterranean.——In Architecture, the *quarter round*, a member or ornament near the bottom of the Ionic, Corinthian, and Composite capitals. It is the *ovolo*; but the name is properly applied only when it is carved with eggs and anchors.——ECHINUS, in Botany, a prickly head or top of a plant.

EC'HIUM (*echion*, from *echis*, a viper: *Gr.*), in Botany, a genus of plants belonging to the nat. ord. *Boraginaceæ*. The *Viper's bugloss*, a British wild plant, belongs to the genus.

EC'HO (*ēchō*, a returned sound: *Gr.*), a sound reflected from some hard surface to the ear. As the undulatory motion of the air, which constitutes sound, is propagated in all directions from the sounding body, it will frequently happen that the air, in performing its vibrations, will impinge against various objects, which will reflect it back, and so cause new vibrations the contrary way. Now, if the reflecting body is at such a distance, &c., as to cause the reflected sound to be both distinct from the original one, and so strong as to be appreciable by the ear, there will be what is called an echo The greater the distance of the reflecting body, the longer will be the time before the repetition is heard; and when the sound, in its progress, meets with objects at different distances, sufficient to produce an echo, it will be repeated several times successively, according to the different distances of these objects from the sounding body; which makes what is called a *repeated echo* Echoes are not, however, caused by a mere reflection of the sonorous particles of air, for then every hard substance would produce an echo; certain conditions are required.—The ear must be in the line of reflection, that the person from whom the sound proceeds may hear the echo If there are several reflecting surfaces, the sound may be brought back by their joint reflection. The reflecting body must not be too near, or the direct and reflected sounds cannot be distinguished: there may be *resonance* without echo. The least distance cannot be less than fifty feet; and about ten distinct sounds may be heard in a second; hence a person situated 512 feet from the reflecting body, will hear the sound one second after it is emitted, and it may repeat about ten syllables. The reflecting surface must be sufficiently extensive, or the echo will be too feeble. A certain concavity in the surface, though not necessary, is very advantageous, as it concentrates several rays of sound to one point Two persons may converse in whispers which will be heard by no one else, if each is placed in the focus of an elliptical building The reflection of sound is governed by the same laws as regulate the reflection of light.——ECHO, in Architecture, any vault or arch constructed so as to produce an artificial echo. These are generally of a parabolic or elliptic form: of this kind is the whispering-gallery in St. Paul's cathedral.——**ECHO**, in Poetry, a sort of verse which returns the sound of the last syllable, the elegance of which consists in giving a new sense to the last words.

ECHOM'ETER (*ēchō*, an echo; and *metron*, a measure: *Gr.*), among Musicians, a kind of scale or rule, serving to measure the duration and length of sounds, and to determine their intervals and ratios.

ECLAIRCISSE'MENT (*Fr.*), the clearing up of anything not before understood.

ECLAMP'SIS (*Gr.*, from *eklampo*, I shine forth), in Medical Science, scintillations or flashings of light in the eyes; a symptom of epilepsy.

ECLA'T (*Fr.*), a burst of applause; renown following some action or event.

ECLEC'TICS (*eklego*, I pick out: *Gr.*), those philosophers who, without attaching themselves to any particular school, select what appears to them the best and most rational from each.——Anciently, they were a sect of Greek philosophers who endeavoured to mould the doctrines of Pythagoras and Plato, and blend them with the theology of the Egyptians and the tenets of Zoroaster. They borrowed many of the principal dogmas of Christianity from the catechetic school of Alexandria; and, combining these with the mysticism of Pythagoras, the errors of Plato, and the superstitions of Egypt, they hoped to reconcile the Christians and Pagans to the same opinions.——In Art, the school of the Carracci is termed 'eclectic,' because they endeavoured to select the chief excellences of other schools and artists, the grandeur of the Florentine, the grace of the Roman school, the colouring of Titian, &c. 'The Carracci were the unapproached representatives of the eclectic school. In the attempt to combine the excellences, however great, of various minds, the chief recommendation of human productions, viz. the evidence of individual character, the moral physiognomy, which in its sincerity and passion atones for so many defects, is of necessity wanting.'—**EASTLAKE.**

ECLEGM' (*ekleigma*, an electuary; from *ek*, away; and *leicho*, I lick up: *Gr.*), a medicine made by the incorporation of oil with syrups.

ECLIP'SE (*ekleipsis*, literally a forsaking: *Gr.*), in Astronomy, an obscuration of the light of the sun, moon, or other luminary, by the interposition of another heavenly body between it and our sight. An eclipse of the *sun* is caused by the intervention of the moon, which totally or partially hides the sun's disc; an eclipse of the *moon* is occasioned by the shadow of the earth, which falls on it and obscures it, either wholly or in part. In endeavouring to understand the true nature of eclipses, the mind must figure to itself the body of the sun, irradiating the earth on one side of its globe, which, being a solid body, intercepts the rays, and therefore projects a long conical shadow from its opposite side: now, when the moon happens to come in a line with this shadow, it falls upon her, and she is eclipsed. An eclipse of the moon is *partial*, when only a part of its disc is within the shadow of the earth; it is *total*, when all its disc is within the shadow. As the moon is actually deprived of her light during an eclipse, every inhabitant upon the face of the earth, who sees the moon, sees the eclipse. It is evident that there will be an eclipse of the sun or moon, only when the sun, moon, and earth are in the same right line, or very nearly so. There must be two, and there may be three, eclipses of the moon every year. The sun can only be eclipsed at the new moon, or when the moon, at its conjunction, is in or near one of its nodes. There must be two, and there may be four, eclipses of the sun every year; and these may be *partial*, *total*, or, *annular* when the shadow is sufficiently extensive to hide only the centre of the sun's disc. Besides the cone of shadow, within which no rays can enter, there is a surrounding space, to which rays can come from some portions of the luminous body: this is called the penumbra (almost a shadow: *Lat.*) of the body causing the eclipse. The nearer the spectator is to the *umbra* or shadow, the deeper the *penumbra*, because the larger the portion of the luminous body screened by that which is interposed. With an eclipse of the sun, the relative positions of the sun and moon are not independent of the observer's position, since, as the sun is not actually deprived of his light, a spectator may see the sun, without perceiving the eclipse; as he may, on account of his position, have none of the rays coming to him from it intercepted. An eclipse of the sun begins on the western side of his disc, and ends on the eastern; and an eclipse of the moon begins on the eastern side of her disc, and ends on the western.——The ancient Greeks and Romans were greatly alarmed by eclipses, supposing them presages of the most dismal events.

ECLIP'TIC (*ekleipsis*, an eclipse: *Gr.*), in Astronomy, the sun's apparent path; or a great circle of the celestial sphere, supposed to be drawn through the middle of the zodiac; or it may be defined, that circle of stars in the heavens, through which the earth would appear to move, if it were seen from the sun. The axis of the earth is not perpendicular to the plane of the ecliptic, but declines from that perpendicular 23° 27′ 56″. [See **EARTH**.] The ecliptic obtained its name from the fact, that eclipses happen only when the moon is in its plane, or very near it.——**ECLIPTIC**, in Geography, a great circle on the terrestrial globe, not only answering to, but falling within, the plane of the celestial ecliptic.

EC'LOGUE (*eklogē*, a picking out: *Gr.*), a selection of passages from a book; a short poem. The Bucolics of Virgil consist of ten Eclogues, in which shepherds are represented conversing with each other.

ECON'OMY (*oikonomia*: from *oikos*, a house; and *nemo*, I manage: *Gr.*), the frugal expenditure of money, with the prudent management of all the means by which property is saved or accumulated. It also signifies a judicious application of time and labour. In a more extended sense, it denotes the regulation and disposition of the affairs of a state or nation, which is called *political economy*. And it is likewise applied to the regular operations of nature in the generation, nutrition, and preservation of animals or plants: as *animal* economy, *vegetable* economy.

ECPHONE'SIS (*ekphōnēsis*, an exclamation: *Gr.*), in Rhetoric, a figure of speech used by an orator to give utterance to the warmth of his feelings.

ECPHRAC'TIC (*ekphraktikos*, capable of removing obstructions: *Gr.*), in Medicine, that which has the property of dissolving or attenuating viscid matter, and of removing obstructions.

ECPHYSE'SIS (*ekphusēsis*, an emission of the breath: *Gr.*), in Medicine, a quick breathing.

ECPIES'MA (*ekpiesis*, a violent squeezing: *Gr.*), in Medicine, a fracture of the cranium when the bones press inwardly on the membranes of the brain

ECPLEX'IS (*ekplēxis*, a consternation: *Gr.*), in Medicine, that state of motionless stupor in which a person appears to lie when in a trance.

EC'STASY (*ekstasis*, entrancement: *Gr*), that state of mind in which the functions of the senses are either suspended or transported with rapture by the contemplation of some extraordinary object ——In Medicine, a species of catalepsy, in which the person remembers, after the paroxysm is over, the ideas he had during the fit

ECSTAT'ICI (*ekstatikoi*, from same: *Gr*), a sort of diviners amongst the Greeks, who for a considerable time lay in trances, deprived of all sense and motion, but when they returned to their former state, gave strange accounts of what they had seen and heard during their supposed absence from the body. Ecstatics are found among the saints of the Roman Catholic church.

ECTRO'PIUM (*ektropion*, from *ektrepo*, I turn aside: *Gr*), in Surgery, that state in which the eyelids are inverted or retracted, so as to show their internal or red surface, and not sufficiently to cover the eye. It arises from the tumefaction of the inner membrane, or from a contraction of the skin which covers the eyelid

EC'TYPE (*ektupos*, worked in high relief: *Gr*), a word sometimes used by antiquarians, and signifying an impression of a medal, seal, or ring, or a figured copy of an inscription or other ancient monument.

EDDAS The two Eddas (or Great Grandmothers), which afford us the earliest specimens of the Scandinavian language, were composed in Iceland. The elder one, containing old mythic poems, is of uncertain date. The younger one, a prose account of the ancient mythology, is attributed to Snorri Sturluson, who died 1241

ED'DY (*ed*, water; and *ea*, backwards: *Sax*), a current of water running in a contrary direction to that of the main stream. — EDDY-TIDE or EDDY-WATER, the water which runs back contrary to the tide; or that which falls back on the rudder of a ship under sail, and is called *dead-water*.—— EDDY-WIND, the wind returned or beat back by any obstruction.

EDE'MATOUS or ŒDE'MATOUS (*oidēma*, a swelling: *Gr.*), in Medicine an epithet applied to a white, soft, and insensible tumour, arising from water collected in the cellular membranes.

E'DICT (*edictum*, from *edico*, I publish; *Lat.*), an order issued by a prince to his subjects, as a rule or law requiring obedience. In Roman history we frequently meet with the edicts of the emperors; and the edicts of the prætors, containing notices to the people of the manner in which they intended to execute the laws.——The *Edictum perpetuum* was a collection of all the laws which had been yearly published by the prætors in their edicts It was made by direction of the emperor Adrian, and was so called because it was intended to continue in force, and serve as a guide and rule in the administration of justice throughout the empire.

EDI'TION (*editio*, a publishing: *Lat*), the number of copies of a work printed before the types are *distributed*. One who prepares the writings of another for publication is called the *editor*; the latter revises, adds notes, and sometimes makes additions to the work, and even rewrites a great portion of it. The *publisher* is the bookseller who negotiates the sale of the impression The edition sometimes goes by the name of the editor: thus, 'Bentley's Horace;' sometimes by the name of the printer or publisher, thus, the 'Aldine' and 'Elzevir' classics, from the celebrated houses of Aldus and Elzevir An *editio princeps* means the earliest printed edition of an author, an *editio optima* is what is considered the best edition.

EDUCA'TION (*educatio*, from *educo*, I bring up: *Lat.*), in its most extended sense, the art of developing and cultivating the physical, intellectual, and moral faculties *Physical education* includes all that relates to the organs of sensation and the muscular and nervous system. *Intellectual education* develops and improves the powers of the understanding. *Moral education* comprehends the various modes of cultivating and regulating the affections, and forming right ideas as to the relation of man to man. Nothing is more shackled by prejudice, more perverted by fanciful theorists, or more abused by the unblushing effrontery of ignorant and artful empirics, than EDUCATION. But too often, attention is almost wholly directed to external show, but little being given to the communication of solid and useful instruction. There is a great tendency in the present day to impart *superficial* knowledge, to instruct in *too many* branches, without teaching any of them thoroughly, or properly considering the kind of information which is required by the circumstances or position of the pupil. It is not too much to assume, that according as this intellectual nutriment is administered, it becomes the germ of happiness or misery to the individual A good educator considers not only the communication of knowledge, but also the training of the pupil; that is, the formation of habits, and the increase of his mental strength, by the right kind and amount of exercise. The education of each sex must be suited to its peculiar wants, and the peculiar position to be occupied by it in after life. The education of females should have a special reference to their performance of domestic duties, and to their obligations as wives and mothers; not that it is in all cases to exclude the higher branches of knowledge, or those usually considered as belonging properly to the other sex. When we consider the great and just influence which the female sex exerts in directing the early ideas of man, and in forming the habits of his future life, we must readily admit that it is most desirable they should be endowed with every species of knowledge which is conveniently within their reach, and which may turn that influence to good.—The education of youth was strictly attended to, both by the Greeks and Romans The minds and bodies of young persons were improved at the same time; their minds by every necessary branch of knowledge, and their bodies by the manly exercises of the Campus Martius, or private contests and trials of skill, agility, and strength. It was the chief aim of the Romans, as well as of the Greeks, to make their children shine in the senate and in the field, at the forum, and in the public games. Oratory was an object which they kept constantly in view; and whatever was their destination, they endeavoured to acquire the art of elocution and a habit of fluent reasoning. Lacedæmon trained her hardy sons to despise danger, endure fatigue, and seem insensible to pain—to maintain their honour unstained, to love their country, and hold in contempt riches, and all that train of enervating pleasures, which are the companions of affluence So far all this was meritorious in a high degree; but how circumscribed must the space have been which was then allowed for intellectual exertion, when the whole world of science was a *terra incognita!*

EDULCORA'TION (*edulco*, I sweeten. *Lat.*), in Chemistry, the act of separating, purifying, or freeing any substance from the saline particles with which it may be impregnated, or those that may be left adhering to it after any operation, by frequent ablutions with water.

EEL (*aal: Ger.*), the popular name of fishes belonging to several genera. They are of elongated form, and are distinguished from other fishes by the absence of ventral fins, and of the two bones in the upper jaw, called maxillary and premaxillary. The gill openings are usually small slits not placed at the edge of the gill covers. Most of them are very voracious. We have specimens in our streams and lakes of the freshwater genus *Anguilla*, and the sea contains the conger eel and many other species.

EEL'-SPEAR, a forked instrument with three or four jagged teeth, used for catching eels.

EFFECT' (*effectus*, from *efficio*, I bring to pass: *Lat.*), the consequence of a cause, sometimes simple and visible, sometimes complicated and invisible, but always simultaneous with the cause.——The word *effects* signifies personal or movable goods.

EFFEC'TIVE (*effectivus*, from same: *Lat*.), in Military language, an epithet for a body of men that are fit for service.

EFFERVES'CENCE (*effervesco*, I boil up: *Lat*.), the escape of gaseous matter from liquids, as in fermentation. The liquid has the appearance of boiling, and the effect is most frequently due to the liberation of carbonic acid.

EFFE'TE (*effetus*, exhausted, like one who has brought forth: *Lat.*), barren. An animal becomes *effete* by losing the power of conception: the earth may be rendered so by drought, or by exhaustion of fertility.

EFFI'CIENT (*efficio*, I bring to pass: *Lat.*), causing the intended effect. The *efficient cause* is that which produces; the *final cause* is that for which anything is produced

EFFLORES'CENCE (*effloresco*, I begin to bloom: *Lat.*), the spontaneous crumbling down of transparent crystals, on account of the loss of water. This term was adopted by the older chemists, because of a fancied resemblance of the resulting powders to flowers.

EFFLU'VIA (*effluo*, I flow forth: *Lat*.), the vapours arising from putrefying substances. Malignant effluvia are considered to be the frequent causes of plague and other diseases.

EFFU'SION (*effusio*, a pouring out: *Lat*.), in Surgery, the escape of any fluid out of the vessel or viscus naturally containing it; also the natural secretion of fluids Blood may, on account of a wound, flow from the chest into the cavity of the pleura, or an injury to the head may cause effusion on the brain

EFT (*Sax*.), or *Newt*, common names of some small batrachian reptiles, which live in water, and, like the frog, undergo metamorphosis The great white newt (*T palustris*) is about six inches long; common water newt (*Triton aquaticus*) about three.

EGG, a body formed in a peculiar cavity in the interior of female mammals and lower animals, from which, when fertilized, another member of the species is produced. Taking the egg of a hen as an example, we find on the outside a calcareous shell, which is lined by a double membrane. Inside this is an albuminous substance, the *white* consisting of several layers, and surrounding the *yolk*, which has its own membrane, the vitelline membrane. Before the egg was laid, there was in the middle of the yolk a minute vesicle, called the germinative vesicle, and this contained a smaller one, the germinative dot. The most important part of the egg is the *vitellus*, or yolk. It is an aggregation of granules and drops of oily fluid.——The quantity of eggs consumed in England appears almost incredible. Independently of the home produce, which is immense, the number of eggs annually imported from France, and other parts of the continent, is much more than 100 millions

EGG'-PLANTS, the common name of some plants belonging to the genus *So-*

'anum; so called because the fruit is like an egg.

EG'LANTINE (*églantier: Fr.*), the old English name of the *sweet-briar:* it has been incorrectly applied by Milton to the honeysuckle.

E'GRET (*aigrette: Fr.*) the name of two birds of the heron genus, viz. the great egret, or great white heron (*Ardea alba*), and the little egret (*Ardea garzetta*). Both are of extreme rarity in England.

EI'DER-DOWN (*eider dunen: Ger.*), the soft feathers of the *eider-duck*, plucked by the female from her breast, for the purpose of lining her nest. The bird breeds amongst precipitous coast rocks in the north of Europe.

EI'DOGRAPH (*eidos*, form; *graphein*, to write: *Gr.*), an instrument by which a drawing may be copied on a reduced or on an enlarged scale.

EISTEDD'FOD (*eistedd*, to sit: *Wel.*), the assemblies of the Welsh bards. Judges were appointed to decide on the merits of the respective minstrels by the Welsh princes, and, after the conquest of the principality, by the English kings The last commission issued for that purpose was in 1568. The Gwyimedigion and Cambrian societies have revived these meetings, for the recitation of prize poems, and performances on the harp.

EJECT'MENT (*ejectio*, a casting out: *Lat.*), a personal action, in the form of trespass, in which a tenant for years claims damages for his expulsion from land demised to him: it has become the usual mode of trying questions of right to a real property. The party who claims land, or its appurtenances, not in his possession, is the real plaintiff: but up to 1852, by a strange fiction, he did so through the means of a fictitious tenant named *John Doe*, who complained of being ejected from his farm by the defendant. The defendant disputed plaintiff's right to let the land, and if the plaintiff succeeded, he recovered *nominal damages*, and also the *land itself* for the term of *Doe's* supposed demise: that is, for the term of his own right But at present, the real name of the claimant is set forth in the writ.

ELÆAG'NUS (*elaia*, an olive tree; and *agnos*, a willow: *Gr.*), in Botany, a genus of trees, nat ord. *Elæagnaceæ.* Most of the species have their leaves covered with scurfy scales, which, under the microscope, are seen to be of a regular stellate form.

ELA'OLITE (*elaion*, oil; and *lithos*, a stone: *Gr.*), called also *fellstein*, a crystalline mineral, more or less translucent, of a greasy appearance, and varying in its colour from greenish-blue to flesh-red. It consists of silica, alumina, and potash.

ELASTIC'ITY, or ELAS'TIC FORCE (*elauno*, I set in motion: *Gr.*), that inherent property of bodies by which they restore themselves to their former figure, after any external pressure or tension. It is very observable in a bent bow, steel springs, and the like. *Perfectly elastic* bodies are those which restore themselves with the same force with which they were bent or depressed; those which do not restore themselves with exactly the same force being called *imperfectly elastic* bodies. The air is *elastic;* vapours are *elastic;* and when the force compressing them is removed, they instantly expand or dilate, and recover their former state. When an elastic solid body is made to vibrate by a sudden stroke, the vibrations are made in equal times, wherever the stroke may be applied; hence a bell always gives the same tone, however struck.

ELATER'IDÆ (*elatēr*, a driver: *Gr.*), in Entomology, a family of beetles possessing a pectoral spine in a sheath. When these insects are laid on their backs they bend themselves until they rest only on the extremity of the head and wing cases. The effort being suddenly relaxed, the head and thorax fly up, and the base of the wing-cases strikes the supporting surface so forcibly that the beetle is jerked a considerable height into the air. The *Pyrophorus noctilucus*, or fire-fly of the tropical parts of America, belongs to this family.

ELATE'RIUM (*elaterion*, literally that which drives away: *Gr.*), a substance prepared from the pulp of the *Ecbalium agreste*, or wild cucumber, a plant belonging to the nat. ord. *Cucurbitaceæ*, which grows in the south of Europe. It is imported in thin cakes, of a greenish colour and bitter taste. It is a powerful cathartic, and is used to diminish the amount of fluid in cases of dropsy.

EL'ATINE, the active principle of *elaterium.*

EL'BOW (*elbogen: Ger.*), in Anatomy, the juncture of the *cubitus* and *radius*, or the outer angle made by the flexure or bend of the arm.——ELBOW, in Architecture, a term used for an obtuse angle of a wall, building, road, &c., which deviates somewhat from a right line.

EL'DER (*ealdor: Sax.*), a person advanced in life, and who, on account of his age and experience, is selected to fill some important office. In Jewish history, the *elders* were persons the most considerable for age, experience, and wisdom. Of this sort were the seventy men whom Moses associated to himself in the government of his people; such also were those who afterwards held the first rank in the synagogue as presidents. In the first Christian churches *elders* were persons who enjoyed offices or ecclesiastical functions, and the word includes apostles, pastors, presbyters, bishops, or overseers; hence the first councils of the Christians were called *presbyteria*, or councils of *elders.* In the modern Presbyterian churches, *elders* are officers who, with the ministers and deacons, compose the sessions of the kirk, and have authority to inspect and regulate matters of religion and discipline.——ELDER, the popular name for small trees belonging to the genus *Sambucus*, nat. ord. *Caprifoliaceæ.* There are several species; some bear black, some white, and others red berries. The stem and branches contain a soft pith.

EL DORA'DO (the golden region: *Span.*), a name given by the Spaniards to an imaginary country supposed to be situated in the interior of America, between the rivers Orinoco and Amazon, abounding in gold and all kinds of precious stones. 'Guiana, whose great city Geryon's sons call El Dorado.'—MILTON.——In the language of poetry, it now means a paradise of boundless wealth and felicity.

ELEAT'IC, an epithet given to a certain sect of philosophers, so called from Elea, a town of Campania, where some of them lived about 500 years B.C. Xenophanes is usually considered the founder of the school, and his most celebrated followers were Parmenides and Zeno of Elea. Xenophanes thought that the universe was eternal and immutable. Parmenides taught that Reason alone was capable of recognizing truth, and that the impressions made on the senses were deceptive, and occasioned by two opposite principles, fire or light, and cold or darkness, whence came all the appearances of change. Zeno attempted to prove by four arguments that there is no such thing as motion, one of these having for its illustration the celebrated story of Achilles and the tortoise. The Eleatics are considered to be the founders of philosophical pantheism.

ELECAMPA'NE, in Botany, the vulgar name for the *Inula Helenium*, an aromatic composite plant, from the root of which a preparation was made that was formerly used as an expectorant; also, a name given to a coarse candy, containing little else than coloured sugar.

ELECT' (*electus*, chosen: *Lat.*), in Theology, among Calvinists, a term for those whom they believe God has chosen, or predestinated to be saved.——ELECT, in matters of polity, signifies chosen, but not inaugurated. Thus, the lord-mayor of London, before his predecessor's mayoralty is expired, is called the lord-mayor *elect*.

ELEC'TION (*electio*, a selection: *Lat.*), the act of choosing a person to fill an office or employment by any manifestation of preference. The term is applied to the choice of members of the legislature, which takes place within, at most, every seven years; to the selection of parish officers annually; and to the admission of members into societies. Sometimes it is practised by show of hands, sometimes by ballot, and at others by every elector giving his vote separately, with an oath in regard to his right and integrity.——ELECTION, in Theology, divine choice, by which persons, according to the Calvinistic creed, are distinguished as objects for salvation by the special grace of God, without reference to their good or bad deeds.

ELEC'TIVE (*electus*, a choice: *Lat.*), dependent on choice, as an *elective* monarchy: opposed to hereditary.

ELEC'TOR (a chooser: *Lat.*), in Law, any one who has the right of giving his vote at an election, particularly at the election of a member of parliament.——ELECTOR, in Political History, the title of such German princes as formerly had a voice in the election of the emperor of Germany; most of them have assumed the title of king.

ELEC'TORATE (from *last*), the dignity or territory of an Elector, that is, one who had the right of voting at the election of an Emperor of Germany. Most of them, since the abolition of the empire in 1805, have assumed the title of king.

ELEC'TRIC CLOCKS. It was soon found that electro-magnetism might be applied to the production of motion; masses of soft iron being alternately attracted by and set free from electro-magnets, by alternately making and breaking battery connection. But the means necessary to be employed were too complicated, and, compared with steam, too expensive for economic use. It has, however, been successfully applied as a means of communicating motion to clock-work; and it is particularly adapted to keep a number of clocks in perfect harmony, by using one, either ordinary or electric clock, to make and break battery communication, which simultaneously moves the hands of all the rest, however distant they may be.

ELEC'TRIC LIGHT. Many attempts have been made, from time to time, to use electricity as a means of illumination. The impossibility of insulating *machine electricity*, particularly in certain states of the atmosphere, on account of its high intensity, would alone be sufficient to render it inapplicable for the purpose. Galvanic electricity, being of much lower intensity, does not present the same obstacle. If two pieces of charcoal are made a portion of the connection between the elements of a powerful galvanic battery, provided they are not too far asunder, the electricity will pass between them; and on their being drawn farther apart, an intensely brilliant arch of light will be produced. But as carbon is gradually transferred by the electric current from one piece of charcoal to the other, the distance between the pieces becomes, after a while, too great, and the light is diminished or altogether extinguished. Various plans have been proposed to remedy this inconvenience; the best being the movement of one of the pieces of charcoal with machinery, regulated by the action of the apparatus itself, so as to maintain the proper space between them.

ELEC'TRIC TEL'EGRAPH, or, more correctly, the **ELECTRO-MAGNETIC TELEGRAPH.** If the conducting wire which unites the two elements of a galvanic battery be parallel to a magnetic needle before the current is transmitted, the needle will immediately arrange itself at right angles to the wire, when the current is made to pass along the wire. [See ELECTRO-MAGNETISM.] The effect of the electric current on the needle is doubled, if the conducting wire is bent round so as to pass along the opposite side of the needle; and as these convolutions of the wire are increased in number within certain limits, their effect also is augmented. With such an apparatus, each time the electric current is established and broken, there will be a separate deflection of the needle. As the conducting wire may be of any length, provided the battery is sufficiently powerful, we have at once a means of communication between distant places and a system of signs suggested: one deflection may mean one thing; two in succession another, and so on. But the signals at our disposal are doubled in number if, by reversing the electric current, we cause the deflections to be made in the opposite directions, and their amount is still further increased if we combine deflections in opposite directions. This is in fact the electric telegraph; since all the different forms it assumes are no more than modifications of it. It is found unnecessary to use two wires—one for the *direct* current from one place to another, and the other for the *return* current from the second place back again to the first: the earth answers for one of them. Of course, when more than one message may have to be communicated at the same time, different wires must be used. It is clear that all the needles in connection with a given wire will be deflected at the same time by the electric current. When, therefore, it is notified for what place the message is intended, the connection with the other needles at the different stations being cut off, the current is not uselessly retarded. As the telegraph clerk may not be attentive, his notice is attracted by an alarm bell, set ringing by the electric current. The wires are sometimes carried through the air on poles, insulation being secured by the use of glass or porcelain connections for attaching the wire to these supports; sometimes in tubes underground, insulation being effected by gutta percha, &c.; sometimes over the tops of houses, through the sea, &c. An apparatus with two needles is used at all principal stations: it may be considered as a combination of two simple ones; with it, the reading of the signals is more rapid; but it has the inconvenience of requiring two wires. Apparatus has been invented for printing or writing a message instead of merely indicating it.

ELEC'TRICAL EEL, the *Gymnotus electricus* of ichthyologists, a fish shaped like an eel, which inhabits rivers in tropical South America. It possesses an internal electrical apparatus, from which, at the will of the animal, a shock can be transmitted to another animal. These shocks are so violent that even horses are stupified by them. In this way the animal obtains its prey. Specimens 5½ feet long have been found, and smaller ones have been brought to Europe. With these various electrical experiments have been tried.

ELEC'TRICAL MACHI'NE, an instrument or apparatus for generating electricity. Electrical machines are of various kinds, but the *cylindrical* is the most common, and probably the most convenient. It consists of a glass cylinder, fixed in such a manner that it may be turned with a winch; a cushion, supported by a glass pillar, and having a piece of silk which comes between it and the cylinder; and a metallic body, which is supported by a glass pillar, and is called the *prime* or positive *conductor*, or simply the *conductor*. If the cushion also is insulated by a glass pillar, to which is attached a similar metallic body, the latter is called the *negative conductor*. The electricity obtained from the prime conductor is *positive* or vitreous: that from the negative conductor, *negative* or resinous. The *plate electrical machine* differs from the cylindrical, chiefly in having a circular plate of glass, instead of a glass cylinder which is electrically excited by friction of the rubber. If we require positive electricity, the prime conductor must be insulated, and the negative conductor joined by a wire or chain to the ground, since all the electricity capable of being removed from the cushion and negative conductor would soon be withdrawn from them. If we require negative electricity, it is the negative conductor which must be insulated, and the positive which must be connected, by a wire or chain, with the earth. ——ELECTRIC INDUCTION, that action which an electrified body possesses of exciting electricity in any other conducting body near it.——ELECTRIC RUBBER, a cushion of horsehair, covered with leather, and slightly coated with an amalgam, consisting of mercury, tin, and zinc, which have been fused together, and pounded with tallow in a mortar. The flap of silk attached to the rubber is used to keep the electricity from being dissipated before it is drawn away to the conductor, by points attached to the latter; and also to increase the friction. Everything connected with electrical apparatus must be perfectly dry and clean, since moisture or dust carries away the electric fluid. On a very damp day, it is extremely difficult to make electrical experiments successfully, whatever precautions are taken.——ELECTRIC SHOCK, the effect produced on the animal body by transmitting through it a current of electricity, or the sudden withdrawal of a charge of electricity.

ELECTRIC'ITY (*elektron*, amber: *Gr.*), a peculiar affection of matter. Also that branch of science which treats of this. The name is derived from the Greek word signifying amber, the electrical properties of which were remarked 600 years before the Christian era; but electricity can scarcely be considered to have become a distinct branch of science before the commencement of the 17th century, when a book, containing accounts of several electrical experiments, was written by Dr. William Gilbert; and it is only since the year 1745, when the properties of the *Leyden jar* were discovered, that it has made any considerable progress. From that time, however, electricity became the subject of constant research and careful experiment; and, as a science, it advanced with great rapidity under the auspices of Franklin, Priestley, and others. Various theories have been put forward as to what electricity is. It is usually spoken of as a fluid, and it is supposed that a body in the natural state is one which contains *two* species of electricity, the one termed positive or vitreous, and the other negative or resinous. These exhibit polar or antagonistic forces, so that if they meet they neutralize each other, and cease to be apparent. Bodies electrified with either electricity, by whatever name it may be called, repel those electrified with the same kind, but attract those electrified with the opposite kind. Bodies vary greatly in their power of transmitting electricity, hence their division into conductors and non-conductors. To the former the metals belong; to the latter, glass, wax, and resins. Substances of this description may be excited by friction, so as to exhibit the attraction and repulsion of light bodies, and emission of sparks or flashes of light, attended with a sharp snapping sound; and such is the rapidity of the electric fluid in motion, that no appreciable space of time is required for its passage to any known distance. The back of a cat, and even the human body, if rubbed in the dark, when the atmosphere is dry, may be made to give out sparks. It is now thoroughly ascertained that lightning is produced by vast quantities of the electric matter, and that thunder is the noise caused by the passage of the lightning. The *Aurora borealis*, or Northern lights, is the effect of the electric fluid moving in the higher regions of the atmosphere; and it may be extremely well imitated, by transmitting electricity through highly rarefied air, which acts, to a certain extent, as a conductor. It is also well known that earthquakes, whirlwinds, and waterspouts are generally accompanied with, and dependent upon, electrical phenomena. Indeed, a change in the condition of matter (for instance, from the liquid to the vaporous form, and *vice versâ*) is always accompanied by a change in its electrical state.

ELEC'TRO CHEM'ISTRY, that science which treats of the agency of electricity and galvanism in effecting chemical changes.

ELECTROL'YSIS (*lusis*, an unloosing: *Gr.*), the decomposition of metallic compounds, by the action of a galvanic current, when a deposition of metal takes place at the negative pole of the battery. Electrolysis is too expensive to be employed in the separation of the commercial metals from their compounds, but this process is largely applied in the operations of electrotyping and electroplating.

ELEC'TRO-MAG'NETISM. Electricity cannot pass through a conductor without magnetism being developed. This important fact, discovered by Oersted, may be proved by a simple experiment. Cause a piece of thin copper wire to lie very near and parallel to a magnetized needle capable of moving on a point: connect the wire with a galvanic battery, so that a current shall pass through: while the current is passing, the needle will not remain parallel with the wire, but will arrange itself transversely to it; and whether the north pole shall be deflected to one side of the wire or the other depends on *which direction* along the wire the current is proceeding, and whether the current is *under* or *over* the needle. Changing *both* the direction of the current and the side of the needle along which it flows, leaves the deflection towards the same side of the wire. This experiment teaches us how to magnetize a bar of steel permanently but slightly, and a bar of iron temporarily but strongly. For this purpose, we must cover a copper wire with silk, cotton, or some other insulating material, and coil it round the bar which is to be magnetized, and which may be either straight or in the form of a horseshoe, &c. On transmitting electricity through the wire, the bar will be rendered magnetic, and the intensity of its magnetism will depend on its softness, on (within certain limits) the length of the wire, and on the power of the galvanic battery employed.

ELEC'TRO-MET'ALLURGY. [See ELECTROTYPE.]

ELECTROM'ETER (*electron;* and *metron*, a measure: *Gr.*), an instrument for measuring the quantity or intensity of electricity, and determining its quality. Several contrivances have been devised for this purpose, but all of them depend on the mutual repulsion of similarly electrified bodies. The simplest is the *pith-ball electrometer*, which consists of two balls about the size of peas, made, for lightness, of the pith of elder, and suspended by two threads of silk. In their ordinary state, they lie in contact, but when electrified, they fly from each other, the amount of divergence depending on the degree of electrical excitement. —The *Gold-leaf Electrometer* consists of a small glass jar, to the upper end of which is attached a brass cap; in the centre of the latter is fixed a piece of glass tube; a wire passes through the tube, having at its upper end a brass ball, and at its lower, two narrow slips of gold leaf, hanging together by one end of each. These slips remain parallel, and in contact, when the instrument is unelectrified; but, when it is electrified, by placing an excited body in contact with or near its brass ball, the lower extremities of the gold leaves fly asunder. The glass jar protects the gold leaves from injury.—The *Quadrant Electrometer* consists of a stem of ivory, at the upper end of which is a graduated quadrant or semicircle, from the centre of which hangs down a very light index, having a pith ball at its lower extremity. When this instrument is fixed on an unelectrified conductor, the index and pith ball will lie close to the ivory stem; but when the conductor is charged with electricity the index and stem will mutually repel each other, and the divergence will be indicated by the quadrant or semicircle.—The *Torsion Electrometer* consists of two pith balls, fixed respectively at the ends of a short and slender slip of some very light substance. This slip is suspended horizontally, by the centre of gravity, to a silkworm's thread, or some other very fine filament, hung within a glass jar, in the centre of the upper end of which is fixed a tolerably large glass tube; and at the upper extremity of the glass tube, a movable knob, to the under part of which the filament is attached. The filament passes down through the tube, and into the jar. A short piece of brass wire is fixed in an aperture drilled through the side of the jar, and has a brass ball attached to both its interior and exterior ends. When the instrument is unelectrified, one of the pith balls remains quietly in contact with the brass ball inside the jar; but when it is electrified, by bringing the outer brass ball in contact with an excited body, the pith ball is driven away from the brass ball, in opposition to the force of torsion, the filament being forcibly twisted. If the brass and pith balls are *oppositely* electrified, it may be seen, by moving round the knob above, through what distance the brass and pith balls will attract each other, in opposition to the force of torsion; and as the force of torsion is proportional to the extent through which the filament is twisted, different repulsions or attractions may be very accurately compared.

ELEC'TRO-NEGA'TIVE, charged with *negative* or resinous electricity, and attracted by bodies *positively* electrified.——ELECTRO-POSITIVE, charged with *positive* or vitreous electricity, and attracted by bodies negatively electrified: for instance, by the negative pole or element of the galvanic battery.

ELECTROPH'ORUS (*electron;* and *phero*, I carry: *Gr.*), a very simple instrument for obtaining electricity. It consists of a flat smooth cake composed of resin and a little wax which have been melted together and poured into a small shallow circular tin tray; also, a brass plate with a glass handle; and the skin of a cat prepared for the purpose. Having dried and even slightly warmed the apparatus, and struck the resin smartly a few times with the catskin, we lay the brass plate on the resin; while there, a spark may be obtained from it—in the first instance, on account of the electricity, it removes from the parts of the resin with which it is in contact, and afterwards on account of the electricity produced upon it by the electrical action of those portions of the resin with which it is not immediately in contact On taking the plate away, a spark may be again obtained from it; and every time this is repeated, *two* sparks may be had in the same way—the first due to the electricity repelled from the brass plate by that which remains in the very slight hollow of the resinous cake; the second, to the restoration of the ordinary state of the brass plate when it has been removed from the inductive action of the cake If the apparatus is kept in a dry place, sparks sufficient to explode gases may, without fresh excitement, be taken from it for months.

ELEC'TROSCOPE (*electron;* and *skopeo*, I examine: *Gr.*). Any instrument, such as the gold-leaf electrometer, &c., for detecting the *presence* of electricity, is called by this name.

ELEC'TROTYPE (*electron;* and *typos*, a mark: *Gr.*), the process by which works in relief are reproduced by the agency of electricity, which precipitates certain metals, such as gold, silver, and copper, from their solutions, upon moulds, so as to form a coherent mass equal in toughness and flexibility to hammered metals. The applications of this beautiful process appear almost unlimited, and, as a means of producing facsimiles of art, it is invaluable. The nature of the operation may be illustrated by a very simple experiment:—Plunge two pieces of clean platinum into a solution of sulphate of copper, slightly acidulated with sulphuric acid. No effect will be produced until the pieces of platinum are connected respectively with the poles of a galvanic battery. On doing this, copper will be immediately precipitated on the *catalectrode* or *negative* surface, and the deposit may be made of any desired thickness: if the strength of the solution is kept up by occasionally adding sulphate, the copper will be in the solid form, and may be peeled off the platinum. If the electric current is reversed, the copper will be taken from one piece of platinum and deposited on the other. If the *negative pole* or *cathode* had been a medal, or other irregular surface, a matrix would be formed from it; and, using this matrix in the same way, copper deposited on it would represent the surface of the medal, &c If gold, silver, and other metals are substituted for the copper, the cathode will be gilt, silvered, &c A varnish protects any part we please from being coated with deposit, and a coating of black-lead will render a non-conductor capable of having a deposit formed upon it In the ordinary mode of carrying on the process, two vessels are used; and, dilute sulphuric acid having been poured into one of them, which may be a lamp chimney closed with a bladder at the lower end, it is placed in the other, which contains a strong acidulated solution of sulphate of copper, &c The medal to be copied is hung in the solution of sulphate, being connected by a wire with a piece of zinc hung in the dilute acid. The bladder prevents the fluids from mixing, but does not intercept the electric current from the zinc to the medal On the large scale, a somewhat different arrangement is used, but the principle is the same: the solution of sulphate of copper is placed in a trough of slate, &c; a plate of copper is suspended in it, and also, opposite to the copper, the medals, &c, to be copied. The plate of copper, being united by wire with the zinc element of a separate constant battery, and the metallic rod carrying the medals, &c., with its other metallic element, a deposit is formed on the medals, &c With this arrangement, the constant battery is called the *generating cell*, and the vessel with sulphate solution the *decomposing cell*. In the simple apparatus first described, the lamp chimney containing the zinc was the generating cell, and the external vessel the decomposing cell. When other metals are to be precipitated, plates and solutions of these metals are to be employed in the decomposing cell

ELEC'TRUM (*Lat*; from *elektron* · *Gr*), a term used by the ancients to indicate a metallic alloy, consisting of four parts gold and one silver; also amber.

ELEC'TUARY (*electuarium: Lat.*), in Pharmacy, a form of medicine, composed of powders or other ingredients, incorporated with some syrup, &c. [See ECLEGM.]

EL'EGANCE (*elegantia: Lat.*), in the Fine Arts, grace and lightness, but particularly the latter.

ELE'GIT (he has chosen: *Lat.*—on account of the creditor making a selection of the writ which he will sue out), in Law, a writ of execution, founded upon an ancient statute passed in the 13th year of Edward I. It is addressed to the sheriff, who gives to the judgment-creditor the lands and tenements of the debtor, to be enjoyed by him until the debt is fully paid. After it, the body of the debtor cannot be taken.

EL'EGY (*elegos: from e*, alas; and *lego*, I say: *Gr.*), a mournful and plaintive kind of poem. The principal writers of elegiac verse among the Greeks were Callimachus, Parthenius, and Euphorion; among the Latins, Propertius, Ovid, and Tibullus.

EL'EMENTS (*elementa*, first principles: *Lat.*), the indecomposable constituents of bodies, of which chemists have discovered about 65. These they class as metallic, non-metallic, and intermediate elements; but, in fact, the classes graduate into each other. A list of the elementary bodies will be found under EQUIVALENTS. In the ancient and still popular sense of the word, the elements are understood to be four in number, namely, fire, air, earth, and water; but it is fully demonstrated by the researches of modern science, that earth is a compound of many earths; air, a compound of at least two gases; water, a compound of hydrogen and oxygen; and fire, only the production of light and heat during combustion.——ELEMENTS, in a figurative sense, the principles and foundations of any art or science, as 'Euclid's Elements,' &c.——ELEMENTS, in Divinity, the bread and wine prepared for the sacrament of the Lord's Supper.

EL'EMI, a resin of a strong aromatic odour, and a hot spicy taste, which exudes from incisions made through the bark of various terebinthinous trees. The crystalline resin of elemi is called *elemine*, and is used in making lacquer.

ELEN'CHUS (*elenchos*, a proof: *Gr.*), in Logic, a sophism, or fallacious argument, which deceives the hearer under the appearance of truth.

EL'EPHANT (*elephas: Gr.*), the largest, strongest, and most sagacious of all quadrupeds. It is placed amongst the *Pachydermata*, in the order *Ungulata*. The form of this animal is altogether awkward; the head is massive, the eyes small, and the ears large and pendulous; the body is thick, and the back much arched; the feet are short, round, clumsy, and distinguishable only by the five rounded hoofs in which each of them terminates. The trunk, or proboscis, by which it conveys food and drink to its mouth, and the most singular part of its structure, is a cartilaginous double tube, seven or eight feet long, composed of numerous rings, and extending from the upper jaw. It is of such strength as to be capable of breaking off large branches from trees; whilst, at the same time, it is endowed with such exquisite sensibility, that it can grasp the smallest object. The two large tusks are of a yellowish colour, and extremely hard: the bony substance of these is called *ivory*. The disposition of the elephant is gentle, and his manners social; hence they are seldom seen except in troops. In wandering from place to place, the males, who are furnished with the largest tusks, put themselves at the head, and are the first to face every danger. Elephants shed their teeth eight times, their tusks only once. The latter take the place of the incisor teeth of other animals. Two species are distinguished, one inhabiting India, the other Africa. The latter has a remarkably large ear. The extinct mastodon and mammoth were closely allied animals. Elephants were first used in war by the Greeks, in the time of Alexander the Great; at least, there is no mention of their being so employed before that time. They carried upon their backs large towers, containing from ten to thirty soldiers, who threw missive weapons from thence upon the enemy, being themselves secured within their wooden walls; while the animals did great execution, by terrifying, tearing, and trampling down both horses and men.

EL'EPHANT-BEETLE, the *Megasoma elephas* of entomologists, is a native of South America. It is a member of the family *Dynastidæ*, in the *Lamellicorn* group. It has acquired its name from having a long horn on the thorax, with a shorter one on each side. This insect is frequently three inches in length, but in size it is much exceeded by the Hercules-beetle (*Dynastes Hercules*), also a native of South America, which has a length of five, and sometimes of six inches.

ELE'PHANT'S FOOT, the common name of a plant, *Testudinaria elephantipes*, nat. ord. *Dioscoreaceæ*, a native of the Cape of Good Hope. The short thick rough stem suggested the name.

ELEPHANTI'ASIS (*Gr.*, from *elephas*, an elephant), a species of leprosy, which derives its name from the skin being covered with incrustations like the skin of the elephant, and from the legs swelling to an immense size. It is a dreadful chronic disease, and is regarded as contagious.

ELEUSIN'IA (*Eleusis*, in Greece), in Grecian Antiquity, solemn and mysterious festivals in honour of Ceres and Proserpine They were of two kinds, the less and the greater. The *less*, which were held at Agræ on the Ilissus, were celebrated every year —according to some, in honour of Proserpine only. They were intended chiefly as a preparation for initiation in the *Mysteria*, or rites of the *greater* solemnity. The latter continued nine days, the first portion being celebrated at Athens: it included, most probably, a representation of the whole history of Ceres and Proserpine, and indicated to the initiated, according to common belief, a pleasing prospect of the future state—a purpose not originally contemplated, and perhaps introduced from Egypt. The presiding or initiating priest was termed a *hierophant*. To reveal the secrets of the Eleusinian mysteries was looked upon as a crime that could not fail to draw down the vengeance of heaven.

ELEUTHE'RIA (the feast of liberty: *Gr.*), in Grecian Antiquity, a festival celebrated at Platæa, in memory of the defeat of Mardonius, the general of Xerxes, and in honour of those who gallantly sacrificed their lives for the liberty of their country; also as a bond of union among the Greeks themselves. It was held every fifth year, when prizes where contended for. Slaves, on obtaining their liberty, kept a festival called *Eleutheria*.

ELEVA'TION (*elevatio: Lat.*), in Architecture, an orthographic drawing of the face or side of a building.——ELEVATION, in Astronomy, altitude; the height of the equator, pole, or stars, &c., above the horizon.——In Gunnery, the angle which the chase of a cannon or mortar makes with the plane of the horizon.——ELEVATION OF THE HOST, in the Roman Catholic church, that part of the ceremony of the mass which consists in the priest's raising the host above his head for the people to adore it.

EL'EVATOR (*elevo*, I lift up: *Lat.*), in Anatomy, the name of several muscles, which serve to raise those parts of the body to which they belong; as, the elevator of the external ear, the epiglottis, &c.——ELEVATOR, a surgical instrument, used for raising depressed portions of the skull in trepanning.

ELF (*ælfe: Sax.*), a term now almost obsolete, but formerly used to denote a fairy or hobgoblin, an imaginary being, the creature of ignorance, superstition, and craft.

ELF'-ARROWS, a name given to flints in the shape of arrow-heads, vulgarly supposed to be shot by fairies. They are frequently met with in Great Britain, and there is reason to believe they were weapons of offence among the ancient Britons.

EL'GIN MAR'BLES, a collection of splendid bassi-rilievi and fragments of statuary, which were sent chiefly from the Parthenon of Athens to England, in 1812, by Lord Elgin (hence the name). They are now in the British Museum, having been purchased by government in 1816 for 35,000*l.* They are unquestionably most valuable remains of ancient art, and offer the finest subjects for study. The most important part of the collection consists of sculptures, which were placed on the eastern and western pediments of the Parthenon at Athens. One set represented, when entire, the miraculous birth of Minerva from the head of Jupiter; the other the contest of Minerva and Neptune for the guardianship of Athens. They were executed under the superintendence of Phidias.

ELIMINA'TION (*elimino*, I turn out of doors: *Lat.*), in Algebra, the causing an unknown quantity to disappear from an equation. By means of this process, an equation having only one unknown quantity is obtained from any number of equations having the same number of unknown quantities.

ELIQUA'TION (*eliquatio*, a liquefying: *Lat.*), in Metallurgy, a separation of the different parts of mixed metals by the different degrees of heat required to melt them.

ELI'SION (*elisio*, from *elido*, I strike out: *Lat.*), in Grammar, the cutting off or suppressing a vowel at the middle or end of a word for the sake of sound or metre; as, *th' ensanguined field.*

ELIX'IR (*Arab.*), an old pharmaceutical term, expressing certain essences or tinctures: thus, the mixture of an aromatic tincture with sulphuric acid was called *elixir of vitriol.*——Also, solutions employed by the alchemists in their attempts to effect the transmutation of metals.

ELK, or MOOSE, a quadruped of the deer family, of which it is the largest species. It is a native of the northern regions of Europe and America. It is very shy and wary, requiring great skill on the part of the hunter to bring it within range of his gun. The height at the shoulders is frequently more than six feet, and the male carries a pair of horns which are very broad at the upper end, and weigh sometimes nearly 50 lbs. From the short neck and long legs, the animal is not graceful. The great Irish elk (*Megaceros hibernicus*), whose fossil remains are sometimes found in bone-caverns, was a still larger animal, and is now extinct. The skull and antlers have been known to weigh 86 lbs.

ELL, a measure, of different lengths in different countries. That formerly used in England was the English or Flemish ell: the former being three feet nine inches, or one yard and a quarter, and the latter only twenty-seven inches, or three-quarters of a yard.

ELLIP'SIS (*elleipsis*, literally a deficiency: *Gr.*), in Geometry, an oval or curved line returning into itself, and produced from the section of a cone by a plane obliquely cutting both its sides. It received its name from its plane forming with the base of the cone a *less* angle than that of the *parabola.*——In Grammar, a figure of syntax, by which one or more words are omitted, which the reader may supply; as, 'the horse I rode,' for 'the horse *which* I rode'——In Rhetoric, a figure of speech, by which the orator, through excessive emotion, passes over many things, which, had he been cool, ought to have been mentioned.

ELLIP'SOID (*elleipsis*, an ellipse; and *eidos*, form: *Gr.*), in Geometry, an elliptical spheroid, being the solid generated by the revolution of an ellipse about either axis.

ELM (*ulmus: Lat.*), *Ulmus campestris*, a large forest tree, the wood of which is very serviceable where it may be continually either dry or wet. Accordingly it is proper for water-works, mills, pumps, aqueducts, and ship-planks beneath the water-line. It is also used for naves of wheels, handles for single saws, axletrees, and the like. Three or four species are ascribed to Britain, including the wych elm (*ulmus montana*). About twenty species are known, all inhabiting the colder parts of the northern hemisphere

ELMO'S FIRE, St., an appearance caused by fiery meteors in the atmosphere, often seen playing about the masts and rigging of ships. It is undoubtedly an electrical phenomenon, and is caused, most probably, by the atmospheric electricity being gradually attracted by pointed bodies, such as masts of ships. It may be illustrated on the small scale by taking or giving out electricity with a point, in a dark room.

ELOCU'TION (*elocutio*, from *eloquor*, I speak out: *Lat.*), the art of choosing and adapting words and sentences to the ideas which are to be expressed; or, as it is more usually employed, the management of the voice, countenance, and gesture, in speaking.

ELO'HIM (*Heb.*), a word used in the Pentateuch to signify the Deity; sometimes in place of, sometimes along with, the word

Jehovah. Some critics believe that the passages containing these words may be separated into two distinct narratives, which seem to have been written by different hands, and the writers have been accordingly designated Elohistic and Jehovistic.

ELONGA'TION, in Astronomy, the apparent distance of a planet from the sun.

EL'OQUENCE (*eloquentia*, from *eloquor*, I speak out : *Lat.*), the art of clothing the thoughts in expressions the most suited to produce conviction or persuasion. Strictly speaking, the term should be applied only to *public speaking;* but it is frequently extended to written language. We may infer from Homer, that eloquence was very early in great esteem among the Greeks; and it attained the highest perfection in Demosthenes. The Romans, for a long time, had but little leisure for the cultivation of eloquence: but at length they produced many celebrated orators, the chief of whom was the illustrious Cicero, who was exceeded only by Demosthenes. Eloquence, as an art, comprises *invention, disposition, elocution,* and *delivery*. And a formal oration should contain an *exordium* or introduction; a *narration;* a *proposition, proof,* or *refutation;* and a *peroration*. The Romans distinguished three kinds of eloquence; the *demonstrative*, the *deliberative*, and the *judicial*. Our division is, that of the *bar*, the *senate*, and the *pulpit*. Among the moderns, eloquence is far more subdued and moderate in its character than among the ancients, who permitted very strong expressions, and the most violent gesticulation.

E'LUL, the name of a Jewish month, which nearly corresponded to our August; it was the twelfth month of the civil, and sixth of the ecclesiastical year.

ELUTRIA'TION (*elutrio*, I wash out: *Lat.*), in Chemistry, the separation of substances, by washing them in large quantities of water; the heavier particles fall to the bottom; and the lighter, being suspended in the fluid, are obtained by gradual subsidence. Elutriation is a most convenient way of procuring a substance in the state of an impalpable powder.

ELY'SIAN FIELDS, or ELY'SIUM (*ēlusion pedion*, or *ēlusion*, the pedion being left out by later writers: *Gr.*), in Heathen Mythology, the supposed residence of the blessed after death. The poets describe this region as consisting of beautiful meadows, alternating with pleasant groves, where a serene and cloudless sky was spread over them, and a soft celestial light shed a magical brilliancy over every object. The heroes there practised their favourite sports, danced to the sound of the lyre, from which Orpheus drew the most enchanting tones, or wandered through odoriferous groves, where warbling birds carolled forth their harmony by the side of refreshing fountains. There the earth teemed with plenteous fruits, and the verdure of spring was perpetual; while all cares, pains, and infirmities were exchanged for the purest bliss.——Also, a place on the coast of Campania.

ELY'TRA (*elutron*, the sheath of a beetle's wing: *Gr.*), in Entomology, a name for the hard external sheaths of beetles, under which the membranous wings used in flying are placed when the insects are walking or at rest. They are often adorned with rich colours and a metallic lustre.

EMANA'TION (*e*, out of; and *mano*, I flow: *Lat.*), in Theology, another term for *Pantheism*, which see.

EMANCIPA'TION (*emancipatio: Lat.*), in the Roman law, the setting free a son from subjection to his father. It differed from *manumission*, as the latter was the act of a master in favour of a slave, whereas emancipation put the son in a situation to manage his own affairs, and to marry without his father's consent, although a minor. The word *emancipation* has been applied to the liberation of negroes from Christian slavery, and to the abolition of the disabilities of Roman Catholics in England.

EMAR'GINATE (*emargino*, I take away the edge: *Lat.*), in Botany, having the edge notched. According to the kind of notches, a leaf is said to be *obtusely* or *acutely* emarginate.

EMBALM'ING (*balsamon*, balsam: *Gr.*), the opening a dead body, taking out the intestines, and filling their place with odoriferous and desiccative drugs and spices, to prevent putrefaction. The ancient Egyptians have always been celebrated for the skill with which they exercised the art of embalming. The term is derived from the use of *balsamic* substances in the operation, in addition to those which were saline, and to tanning materials. It appears to have been a dogma among some ancient nations, inculcated by their religion, that the soul continued with the body. Modern chemistry has made us acquainted with many means of counteracting putrefaction, more simple and more effectual than the laborious processes of the ancients.

EMBAR'GO (*Span.*), a prohibition issued by the authorities of a country, to prevent merchant vessels leaving their ports. It is generally imposed in time of war, or during fear of invasion; and in such cases, the ships under embargo are used in armaments, expeditions, &c.

EM'BER WEEK (*æmyrian*, ashes: *Sax.*); or, perhaps, an abbreviation for *Quatember*, from *quatuor tempora*, the four times: *Lat.*), four seasons in the year more particularly set apart for prayer and fasting, namely, the first week in Lent, the weeks next after Whitsuntide, the 14th of September, and the 13th of December.——EMBER DAYS, particular days of fasting and humiliation in the Ember weeks.

EMBERI'ZA, in Ornithology, a genus of passerine birds, including the yellow-hammer, the common and other buntings, and the ortolan (*Emberiza hortulana*), which is esteemed a great delicacy for the table.

EMBEZ'ZLEMENT (*embesler*, to filch: *Old Fr.*), in Law, a felony, which consists in a class of acts committed by one employed as a clerk or a servant, which would, if committed by others, amount to *larceny*. It differs from the latter by relating to property not at the time in the actual or legal possession of the owner.

EM'BLEM (*emblēma*, a tesselated pavement: *Gr.*), a kind of painted enigma, or certain metaphorical figures, painted or cut, expressing some action, or teaching some moral truth.

EM'BLEMENTS (*emblaver*, to sow with wheat: *Fr.*), in Law, a word used for the produce of land sown or planted by a tenant for life or years, whose estate is determined suddenly, by the act of God, after the land is sown or planted, and before a harvest. The tenant's executors shall have the *emblements*; but, in the case of a tenant for years, they include only what is not ripe before midsummer. Fruits on a tree, or natural grasses, are not emblements.

EM'BOLISM (*embolisma*, a patch: *Gr.*), in Astronomical Chronology, the insertion of days, months, or years, in an account of time, to produce regularity.

EMBOS'SING (*bosse*, a protuberance: *Fr.*), the forming of works in relief, whether by raising, or by depression. It is, in short, a kind of sculpture, where the figures project from the plane on which they are cut; and according as they are more or less prominent, they are said to be in *alto*, *mezzo*, or *basso rilievo*.——EMBOSSING CLOTH. Cotton, woollen cloth, silk, paper, and other fabrics, are embossed by the powerful pressure of revolving cylinders on which the required patterns are engraved.

EMBOU'CHURE (a mouth: *Fr.*), in Music, the aperture of a flute or other wind instrument.

EMBRA'CERY (*embrasserie*: *Fr.*), in Law, the endeavouring to corrupt or influence a jury; it is punishable by fine and imprisonment.

EMBRASU'RE (*Fr.*), in Architecture, an enlargement of the aperture of a door or window, on the inside of the wall.——In Fortification, a hole or aperture in a parapet, through which guns are pointed and discharged.

EMBROCA'TION (*en*, on; and *brecho*, I wet the surface: *Gr.*), in Pharmacy, a lotion or combination of medicinal liquids, with which any diseased part is washed or fomented.

EMBROID'ERY (*broderie*: *Fr.*), figured work wrought on silk, cloth, stuffs, or muslins. The art of embroidery was invented in the East, probably by the Phrygians or Persians: it was certainly introduced from Persia into Greece.——EMBROIDERING MACHINE. Until of late, embroidery was performed entirely by hand, and was practised, on account of its elegance, by ladies of rank; but various ingenious machines have been invented for this purpose, and are now used very extensively in England, France, and Germany. One of these machines, having 180 needles, will do as much work as fifteen expert hand embroiderers, and requires merely the labour of one grown-up person and two assistant children.

EM'BRYO (*embruon*, from *bruo*, I cause to burst: *Gr.*), the first rudiments of the animal in the womb, before it becomes a *fœtus*.——In Botany, a fleshy body occupying the interior of a seed, and constituting the rudiments of the future plant. It consists of the *plumula* or growing point, the *radicle* or root, and the *cotyledon* or *cotyledons*. [See SEED.]

EMENDA'TION (*emendatio*: *Lat.*), an alteration made in the text of any book, by verbal criticism.——In Law, the correction of abuses.

EM'ERALD (*émeraude*: *Fr.*), a well-known gem of a beautiful green colour, somewhat harder than quartz; it occurs in prisms with a regular hexagonal base, and ranks next in value to the Oriental ruby and sapphire. It becomes electric by friction, is often transparent, but sometimes only translucent, and before the blow-pipe is fusible into a whitish enamel, or glass. It consists chiefly of glucina, with silica, alumina, a very little lime and iron. Its colouring matter is probably a very minute quantity of oxide of chrome. The most intensely coloured and valuable emeralds are brought from Peru.——In Heraldry, an other name for *vert*, or the green tincture in coat armour.

EMER'SION (*emergo*, I come forth: *Lat.*), in Astronomy, the reappearance of the sun or moon after an eclipse; also of a star that passes from within the rays of the sun.

EM'ERY (from Cape *Emeri*, in the island of Naxos), in Mineralogy, a compact variety of *Corundum*, very generally regarded as a kind of iron ore. It is of a blackish-grey colour, and so very hard as to scratch topaz. It consists of alumina, silica, and iron; and is used in the form of a powder for polishing hard minerals and metals. The lapidaries cut ordinary gems by sprinkling their wheels with the moistened powder of emery; but it will produce no effect on the diamond.

EMET'IC (*emetikos* from *emeo*, I vomit: *Gr.*), a medicine for emptying the stomach by vomiting. Twenty grains of ipecacuanha is a very safe and good emetic, for evacuating the stomach, when it is disordered by improper food; it produces an effect in from ten to twenty minutes, and its action may be assisted by chamomile tea or warm water. When poison has been swallowed, the stomach is often insensible to the ordinary means of acting upon it, particularly if a large dose of opium has been taken. In such a case, half a drachm of sulphate of zinc, or of sulphate of copper, may be given, dissolved in three ounces of warm water; a third part to be taken every ten minutes, until it operates. The stomach-pump, however, is most to be relied upon.

EM'ETINE (*emetos*, a vomiting: *Gr.*), in Medicine, a peculiar vegetable principle, obtained from the root of the *Ipecacuanha*, of whose emetic properties it is conceived to be the sole cause. In a dose of half a grain it acts as a powerful emetic, followed by sleep; and six grains produces violent vomiting, stupor, and death.

EMICA'TION (*emicatio*, a springing forth: *Lat.*), a flying off in small particles, as from heated iron or fermenting liquors.

EMIGRA'TION (*emigratio*, a removal: *Lat.*), the removal of inhabitants from one country to another, for the purpose of permanent residence. Prohibitions of emigration are unjust, as well as impolitic, and always prove that a government which sanctions them has an incorrect idea of its duties. The power of reproduction is so great, that the vacuum caused by any amount of emigration is soon filled up.

EM'INENCE (*eminentia*, excellence, literally a prominence: *Lat.*), an honorary title given to various dignitaries at different times, but appropriated to cardinals by a decree of the pope in 1630.

E'MIR (a chief: *Arab.*), a title of dignity among the Saracens and Turks. It was at first given to all the caliphs, but it is now confined to those who are considered the descendants of Mahomet, by his son-in-law Ali and his daughter Fatima. Joined to another word, indicative of a particular office, it is a common title: thus, *Emir al Omrah*, that of viziers and pashas.

EMOLLES'CENCE (*emollio*, I make soft: *Lat.*), in Metallurgy, that degree of softness in a fusible body which alters its shape.

EMOL'LIENTS (same *deriv.*), in Medicine, such remedies as are supposed to relax the living animal fibre.

EMPA'LEMENT (*in*, on; and *palus*, a stake: *Lat.*), a cruel kind of punishment, in which a stake was thrust up through the body.——In Heraldry, a conjunction of coats of arms, pale-wise.

EM'PEROR (*imperator: Lat.*), among the ancient Romans, a title of honour conferred on a general who had been victorious; but, on the fall of the republic, it was applied to the head of the state. The Roman emperors united in their own persons many of the chief offices of the state. Thus, Octavius was emperor, proconsul, tribune, and pontifex maximus; also, perpetual consul, censor, prince of the senate, and augustus—the latter designation descending to those who reigned after him. The emperors appointed their own successors, who enjoyed the title of Cæsars. Charlemagne assumed the imperial dignity after his coronation at Rome, and since that time it has been claimed by the sovereigns of Germany. When the German empire was dissolved in 1805, the title passed to the emperor of Austria; and it was assumed in the same year by Napoleon in France. The czars of Russia have claimed it since the reign of Alexander.

EM'PHASIS (*Gr.*), in Rhetoric, a particular stress of utterance, or force of the voice and action, given to such parts or words of an oration as the speaker intends to specially impress upon his audience.

EMPHYSE'MA (*emphusēma*, an inflation: *Gr.*), in Surgery, a puffy tumour, formed by the air insinuating itself into the cellular membrane, and rendering the part affected tense and elastic: it crepitates when pressed.

EM'PIRE (*Fr.*; from *imperium: Lat.*), the territory or government of an emperor. The term was first applied to the dominions of ancient Rome, which were ultimately divided into the *Eastern* and *Western* empires. The Eastern was called also the *Lower* empire. The *Western* became, about the end of the 9th century, the *German*, or *Holy Roman* Empire. The word is often used to indicate an extensive territory, not governed by an emperor: thus, the *British Empire*.

EMPIR'IC (*empeirikos*, from *peira*, an experiment: *Gr.*), one whose knowledge is founded on experience. The *empiric school* of medicine was opposed to the *dogmatic*. The empirics were generally a pretending and ignorant sect; and hence the word is used for a quack or charlatan of any kind.

EMPLAS'TICS (*emplastikos*, fit for shutting up the pores: *Gr.*), an appellation given to medicines which constipate and shut up the pores of the body. Hence, *emplastic* means viscous, or adhesive, like a plaster.

EMPO'RIUM (*emporion*, a mart; from *emporos*, one who goes on shipboard as a passenger: *Gr.*), a common resort of merchants for trade; particularly a city or town of extensive commerce, or in which the commerce of an extensive country centres, or to which sellers and buyers resort from different countries.

EMPYE'MA (*empuēma*, a suppuration: *Gr.*), in Medicine, a disorder in which purulent matter is contained in the thorax or breast, after an inflammation and suppuration of the lungs and pleura: it is attended with a difficulty of breathing and an inability to lie on the side opposite to that which is affected.

EMPYRE'UM, or EMPYRE'AN (*empureuo*, I set on fire: *Gr.*), a term used by divines for the highest heaven, where the blessed enjoy the beatific vision. It derives its name from having been supposed to be the region of fire.——We use the word *empyreal* as pertaining to that region of space which is above the utmost limits of the atmosphere.

EMPYREU'MA (*empureuma*, a coal to preserve a smouldering fire; from *empureuo*, I set on fire: *Gr.*), in Chemistry, the peculiar smell produced from burnt substances. Hence oils obtained by distilling organic matters at high temperatures are called *empyreumatic* oils.

EMPYREU'MATA (same *deriv.*), in Medicine, the remains of a fever after the disease has abated.

EMU, the *Dromaius Novæ Hollandiæ* of ornithologists, a large bird of the ostrich family. It attains the length of seven feet, and has brown and grey plumage. It is a shy bird, and being a fleet runner, is chased with dogs. The male hatches the eggs, whilst the female keeps guard.

EMUL'GENT (*emulgeo*, I milk out: *Lat.*), a term applied to the artery and vein of the kidney.

EMUL'SION (same *deriv.*), in Medicine, any milklike mixture prepared by uniting oil and water by means of another substance: as *almond emulsion*.

EMUNC'TORY (*emungo*, I blow the nose: *Lat.*), in Anatomy, a term for any part which serves to carry off the matters thrown off by the blood and other humours: thus, the skin is the *emunctory* of the body.

ENAL'LAGE (*enallagē*, an exchange: *Gr.*), a figure in Grammar, where there is a change of one case or mood for another.

ENAM'EL (*émail: Fr.*), a vitrifiable substance, chiefly formed of the oxides of lead and tin, with soda and silica, in the shape of powdered quartz or flint. These, when melted together, yield a white enamel. Other metallic oxides are employed to communicate colours to the white basis. Enamels are distinguished into transparent and opaque: in the former, all the elements have experienced an equal degree of liquefaction, and are thus run into crystal glass, whilst in the others, some of their elements have resisted the action of heat, so that their particles retain sufficient aggregation to prevent the transmission of light. Enamels are used either in imitating precious stones, in painting in enamel, or in the ornamentation of gold, silver, and other metals. The faces of watches are commonly enamelled Of modern enamels, the Champlevé, the Cloisonné, and Limoges, are most prized by collectors. This art is of such great antiquity as to render it difficult, if not impossible, to trace it to its origin. It was practised by the Egyptians in very remote times, as appears from the ornaments that have been found on the envelopes of mummies. It passed from Egypt into Greece, and afterwards into Rome and its provinces, whence it was probably introduced into Great Britain, as various Roman antiquities have been dug up in different parts of the island, particularly in the barrows, in which enamels have formed portions of the ornaments. Iron cooking vessels are now coated with enamel, and in a very permanent manner, the fire having no effect on them. Artificial eyes are formed so skilfully in enamel, that it is difficult, when in use, to discover that they are not real ——Painting in enamel, &c, is performed on plates of gold or silver, but more commonly of copper, previously coated with the white enamel: the colours are melted in the fire, where they take a lustre like that of glass This painting is prized for its peculiar brightness and vividness, which are very permanent, the colours not being effaced or sullied by time. Jean Petitot, a Genevese, born in 1607, acquired great celebrity as a painter in enamel, and his works are much sought after by collectors. [See LIMOGES ENAMEL.]

ENANTIO'SIS (a contradiction: *Gr.*), a rhetorical figure, by which that which is spoken negatively is to be understood affirmatively.

ENARTHRO'SIS (*Gr.*: from *en*, in; and *arthron*, the socket of the joint), in Anatomy, that species of articulation which consists in the insertion of the round end of a bone into the cavity of another, forming a movable joint.

ENCÆ'NIA (*enkainia*: from *en*, in; and *kainos*, new: *Gr.*), in Antiquity, anniversary feasts to commemorate the completing or consecrating any new and public work, such as the founding of cities, consecration of temples, &c.——ENCÆNIA, among the Jews, the anniversary of the dedication of the Temple. In modern times, this term is used for any commemorative festival.

ENCAUS'TIC PAINT'ING (*enkaustikos*, belonging to burning: *Gr.*), a mode of painting used by the ancients, the nature of which is not well understood The colours were kept in boxes with divisions, and sometimes were made into crayons by means of wax, and melted on the picture by subjecting them to heat as they were applied. When finished, the picture was covered with a varnish of wax, and, lastly, was well polished Though resins, &c., were used, wax was indispensable: it kept the work from cracking The burning-in also was necessary. The colours were very brilliant, and were not acted on by the weather. It has been attempted to revive this art in Germany.——Some have used the term *encaustic* for painting on porcelain and work in enamel; and in the same way, it was given to the painting on glass of the middle ages, such as is still to be seen in the windows of some Gothic churches, &c. It has also been just as erroneously applied to works in metal, where gold and silver were inlaid, melted, or laid on, which was called gold or silver encaustic; and to everything gilt or silvered by fire.

ENCE'INTE (*Fr*), in Fortification, the wall or rampart which surrounds a place, sometimes composed of bastions and curtains Flanked by round or square towers, it is called a Roman wall.——In Law, a term for a state of pregnancy.

ENCHA'SING [See CHASING]

ENCHIRID'ION (*Gr.*: from *en*, in; and *cheir*, the hand), a manual or small volume. Arian, the disciple of Epidetus, the stoic philosopher, compiled certain aphorisms of his master under the title of Enchiridion

ENCLAVE' (enclosed: *Fr*), in Heraldry, something let into another, especially when the piece so let in is square

ENCLIT'IC (*enklitikos*, that which leans: *Gr.*), in Grammar, a particle so closely united with any other word as to seem part of it; thus, *que* in *virumque*.

ENCRATI'TES (*enkrateia*, a holding fast, and hence a restraining one's self: *Gr.*), or CONTINENTES, in Church History, a sect which appeared towards the end of the 2nd century: so called because they abstained from marriage, and the use of wine and animal food

EN'CRINITE (*krinon*, a lily: *Gr.*), the fossil remains of a radiate animal, frequently called the stone lily, found in the mountain limestone and other formations The jointed stalk by which it was attached to a rock was crowned by a disc, surrounded by ten ray-like arms, the centre being occupied by the mouth. This head somewhat resembles a flower, whence the name A close ally of this animal is now living in the West Indies, and is called by naturalists *Pentacrinus caput-medusæ.*

ENCROACH'MENT, in Law, an unlawful intrusion upon the rights and possessions of another.

ENCYCLOPÆ'DIA. [See CYCLOPÆDIA.]

ENDEC'AGON or UNDEC'AGON (*endeka*, eleven; and *gōnia*, an angle: *Gr.*), a plane figure bounded by eleven sides. When the latter are all equal, the surface is the square of one side multiplied by 9·36564.

ENDEM'IC (*en*, amongst; and *dēmos*, the people: *Gr.*), a non-infectious disease, peculiar to a certain district, and arising from local causes. It differs from an *epidemic*, which is a disease that spreads over a whole country.

EN'DIVE (*Fr.*), the *Cichorium endivia* of botanists, a herbaceous composite plant, used in salads.

ENDO'GENOUS (*endon*, within; *gennao*, I produce: *Gr.*), an epithet for plants, the growth of whose stems takes place by additions of vascular bundles internally. In endogenous plants there is no distinction of pith-wood, bark, and medullary rays, as in *exogenous* stems. Palms, grasses, orchids, and lilies, fall into this important division; all the plants constituting it being *monocotyledonous*.

ENDOR'SING (*endorser*, to write on the back of anything: *Fr.*), the writing one's name on the back of a bill of exchange, by which responsibility for its amount is incurred, if duly presented and not paid.

EN'DOSMOSE. [See EXOSMOSE.]

ENDOW'MENT (from *dōs*, a portion: *Gr.*), in Law, the act of giving or assuring a dower to a woman. Also, the settlement of a property for the support of some religious or charitable institution, &c.

ENE'MA (*Gr.*, from *enēmi*, I send into), in Medicine, a clyster or injection.

ENFE'OFFMENT. [See FEOFFMENT.]

ENFILA'DE (*enfiler*, to put on a string: *Fr.*), a fire of artillery or musketry, in the direction of the *length* of an enemy's line. A trench, &c., is said to be *enfiladed* when shot can be fired so as to pass through it lengthways.

ENFI'LED (from *same*), in Heraldry, an epithet implying that the head of a man, beast, or any other charge, is placed on the blade of a sword.

ENFRAN'CHISEMENT (*affranchissement*: *Fr.*), in Law, the incorporating a person into certain societies; as when one is admitted to the privileges of a freeman.—In Feudal Law, a *villein* was said to be *enfranchised* when made free by his lord. The term is also applied to the conversion of the copyhold tenure of lands into freehold.

ENGINEE'R (*ingénieur*: *Fr.*), a term which, in strictness, means the manager of an engine, but which is now applied to any one whose pursuits relate to manufacturing or constructive operations, in which engines of any kind are used. There are two kinds of engineers, military and civil. A *military engineer* is one who, by a perfect knowledge of mathematics, delineates upon paper, or marks upon the ground, forts or other works proper for offence and defence. He should understand the art of fortification, so as to be able not only to discover the defects of a place, but to find a remedy proper for them; as also how to attack as well as to defend. It is his business likewise to delineate the lines of circumvallation and contravallation, taking all the advantages of the ground; to mark out the trenches, places of arms, batteries, lodgments, &c. *Civil engineers* are employed in delineating the plans and superintending the construction of public works, as aqueducts, canals, bridges, railroads, &c.

ENGISO'MA (a fracture of the skull: *Gr.*), in Surgery, a fissure of the cranium. Also, a surgical instrument used in fractures of the cranium.

ENG'LAND, CHURCH OF. Although Henry VIII. threw off the supremacy of the pope, he allowed no freedom in matters of belief, and it was not until the accession of Edward VI. that the English Church was reformed by law. Its constitution was settled by Elizabeth. Few and unimportant are the changes which have been made since, and there has been no alteration in the Liturgy since 1661. The government of the Church of England is episcopal; and all the bishops, except the one last appointed, sit in the House of Lords in right of the temporal baronies into which their sees were converted by William the Conqueror.

ENG'LISH LAN'GUAGE. The ancient language of Britain is generally admitted to have been the same with that of the Gauls; and, when the country was subdued, the original inhabitants retired to the western portion of the island, where it continued to be spoken without any foreign admixture. The greatest part of Britain having become a Roman province, the Roman legions, which resided in Britain for above two hundred years, undoubtedly disseminated the Latin tongue; and the people being afterwards governed by laws written in Latin, it must have necessarily followed that their language would undergo a considerable change. In fact, the British tongue continued for some time mixed with the provincial Latin; but at length it was in a great measure destroyed, and that of the Saxons introduced instead of it. What the Saxon was long before the conquest, viz. about the year 700, may be seen in the most ancient manuscript of that language, which is a gloss on the Evangelists, by bishop Eadfride, in which the three first articles of the Lord's prayer run thus: 'Uren fader thic arth in heofnas, sic gehalgud thin noma, to cymeth thin ric. Sic thin willa sue is in heofnas, and in eortho, &c.' In the beginning of the ninth century, the ancient English acquired a tincture of the Danish; but the Normans, as a monument of their conquest, endeavoured to introduce their language; and English became, under them, a medley. About the year 900, the Lord's prayer in the ancient Anglo-Saxon was as follows: 'Thu ure fader the eart on heofenum, si thin nama gehalgod; cume thin rice si thin willa on eorthan swa, swa on heofenum, &c.' And, about the year 1160, pope Adrian, an Englishman, thus rendered it in rhyme:

'Ure fader in heaven rich,
Thy name be hayled ever lich,
Thou bring us thy michell blisse:
Als hit in heaven y-doe,
Evar in yearth beene it also, &c.'

The English language continued to undergo various mutations till the year 1537, when the Lord's prayer was thus printed: 'Oure father which arte in heven, halowed be thy name: let thy kingdome come, thy will be fulfiled as well in erth as it is in heven; geve us this daye in dayly bred, &c.' Here, it may be observed, the diction is brought almost to the present standard, the chief variations being only in the orthography. After the Conquest, it was ordained that all law proceedings should be in the Norman language; and hence the early records and reports of law cases came to be written in Norman. But neither royal authority, nor the influence of courts, could absolutely change the vernacular language. After an experiment of three hundred years, the law was repealed; and since that period, the English has been, for the most part, the official as well as the common language of the nation. Since the Norman invasion, the language has not suffered any shock from the intermixture of conquerors with the natives of England; but it has undergone great alterations, by the disuse of a large portion of Saxon words, and the introduction of others from the Latin, Greek, French, Italian, and Spanish. In some instances, words have been borrowed by authors, directly from the Latin and Greek, but in the rest, they have been received through the medium of the French and Italian. For terms in the sciences, authors have generally resorted to the Greek; and from this source, as discoveries in science demand new terms, the vocabulary of the English tongue is receiving continual augmentation. We have also a few words derived from the German and Swedish, chiefly terms in mineralogy; and commerce has introduced new commodities of foreign growth or manufacture, with their foreign names, which now make a part of our language. It may then be stated, that the English is composed of, 1st, Saxon and Danish words of Teutonic and Gothic origin: 2nd, British or Welsh, which may be considered as of Celtic origin: 3rd, Norman, a mixture of French and Gothic: 4th, Latin: 5th, French: 6th, Greek: 7th, a few words directly from the Italian, Spanish, German, and some other languages of the continent: 8th, a few foreign words, introduced by commerce, or by political or literary intercourse. Of these the Saxon portion constitute our mother tongue. The Danish and Welsh also are primitive words, and may be considered as part of our vernacular language. Taking the sum total of words in a large English dictionary at 43,566, it will be found that 29,853 are of Greek or Latin origin, 13,230 come from Teutonic sources, whilst the remaining 483 are of miscellaneous derivation.

ENGRAVING (*gravan*, to dig: *Sax.*), the art of producing, most usually by the aid of an instrument called a graver, representations on hard substances, such as metal or wood, which, by means of ink and a printing-press, may be transferred to paper. For this purpose, copper was formerly used. But latterly mixed metals, not liable to be corroded in printing, or steel, have been introduced. The art of engraving on wood is very ancient; and it has been revived with great effect, as may be seen in the 'pictorial' editions of various works recently published. It was in use among the Chinese, at least when they discovered the mode of manufacturing paper, or about 95 years B.C.; and was very probably introduced from that country into Europe, after which it was long and successfully practised by Europeans. The art of engraving on copper was invented in Europe in the early part of the 15th century. The earliest book in which engravings are found is an edition of Dante, published at Florence in 1481. Then, and long before, it had been usual to decorate church and other plate in *niello;* which consisted in etching the designs, with a steel point, upon gold or silver, then engraving with a burin, and filling in with a combination of silver, lead, copper, sulphur, and borax, which was easily fusible, and of a black colour. Before melting in the niello, the artists were in the habit of taking impressions of the design with liquid sulphur; but Finiguerra improved this process, by using for the purpose a mixture of soot and oil, and pressing damp paper upon the plate with a roller. This led to copper-plate engraving.——WOOD ENGRAVING, or *xylography*, (*xulon*, wood; and *grapho*, I write: *Gr.*), is performed on blocks of box or pear-tree, cut in a direction perpendicular to that of the fibres. The subject is first drawn with Indian ink, or a lead-pencil, and then the wood is cut away, so as to leave merely the lines which have been drawn. Impressions are taken from the blocks, in the same way as from printing types.——COPPER-PLATE ENGRAVING is effected by cutting lines representing the subject on a plate of copper, with a graver or burin, the burr being taken off with a scraper.——*Etching* is an engraving on copper, &c., produced by an acid. The plate having been covered with a varnish, and the design having been drawn through the varnish with a suitable implement, the acid is poured on the plate, and this acts upon (or bites, as it is technically termed) the plate where the varnish has been removed *Stippling* differs from etching only in having dots instead of lines.——MEZZOTINTO ENGRAVING consists in first scoring the copper over thickly in every direction, so that if printed from, it would give a uniform black impression: the outline is then traced with an etching needle; after which the plate is scraped, so as to leave enough of the scoring to produce the required tints, in the different parts of the work.——AQUATINTA ENGRAVING gives an effect like that of an Indian-ink drawing. It is effected by first etching the design, then covering the plate with a solution of Burgundy pitch, or mastic, in spirits of wine The rapid evaporation of the spirit leaves a granulated texture; and aquafortis being poured on the plate, it is corroded in the parts left uncovered by the spirits of wine. As in *etching*, when the lighter parts are sufficiently acted upon, they are *stopped out*, that is, protected from further action of the acid.——ETCHING ON GLASS. The glass is covered with bees' wax, and, the design being drawn with an etching needle, is subjected to the action of sulphuric acid sprinkled with powdered Derbyshire spar, which causes hydrofluoric acid to be evolved: the parts covered with bees' wax are entirely protected from the corroding action of this acid. The process may be reversed, by drawing the design with a solution of bees' wax, in turpentine, and then corroding as before.—— LITHOGRAPHY (*lithos*, a stone: and *grapho*, I write: *Gr.*). This process was discovered in 1800. It depends on the facility with which certain kinds of stone imbibe water, and the mutual repulsion between oily or resinous substances and that fluid. The stone employed is a limestone, obtained at Solenhofen in Bavaria, the rock being a member of the oolite. Drawings are made on the stone, which is of a fine grain, with a resinous or oily ink: it is then wetted, and an ink roller is passed over it. The ink will adhere to the lines, which constitute the design, but will leave the rest of the stone perfectly clean, on account of the repulsive action of the water, with which it is soaked. Impressions may be taken every time the ink roller has been passed over the stone. A drawing made with the proper kind of ink may be transferred, by pressure, to the stone, while it is in a dry state.—— CHROMOLITHOGRAPHY (*chrōma*, a colour; *lithos*, a stone; and *graphē*, a drawing: *Gr.*), is the art of printing in colours from stone. A drawing in outline is made in the ordinary way, and transferred to as many different stones as there will be colours employed — sometimes to so many as thirty or more. The first stone, generally that required for flat local tints, is covered with lithographic ink, in those places in which there is to be solid colour; and the different gradations are produced by rubbing the stone with *rubbing stuff*, or tint ink, which is made of soap, shellac, &c., and, where necessary, with a coloured lithographic chalk. The stone is then washed over with nitrous acid, &c.; and, as in ordinary cases, a proof is taken, after which the lithographic ink is immediately washed off with turpentine. If the proof is satisfactory, the stone is ready for use. The other stones are treated in the same way, for the other colours—of course each impression must be printed with all the stones. The colours are ground up with linseed oil.——ZINCOGRAPHY. This consists in drawing the design with a protecting medium on zinc: then biting away the unprotected portions with an acid, which leaves the design prominent, so that impressions may be taken from it.

EN'GYSCOPE (*engus*, near; and *skopeo*, I examine: *Gr.*), a kind of microscope, for viewing small bodies more distinctly.

ENHARMON'IC (*enharmonikos*, in accord: *Gr.*), in Music, an epithet applied to such species of composition as proceed on very small intervals, or smaller intervals than the diatonic and chromatic.

ENIG'MA (*ainigma*, from *ainisso*, I speak darkly: *Gr.*), a dark or ambiguous saying, in which the true meaning is concealed under obscure language. The enigma is, at present, a mere *jeu d'esprit:* in former times it was a more serious matter. The Eastern monarchs used to send embassies to each other for the solution of enigmas. Samson proposed an enigma to the Philistines.

ENNEAHE'DRIA (*ennea*, nine; and *hedra*, a base: *Gr.*), a genus of columnar and double-pointed crystals, composed of a trigonal column, terminated at each end by a trigonal pyramid.

ENNEAN'DRIA (*ennea*, nine; and *anēr*, a male: *Gr.*), the name of the ninth class in Linnæus's sexual system; consisting of plants which have hermaphrodite flowers, with nine stamens.

ENNEAT'ICAL DAYS (*ennea*, nine: *Gr.*), every ninth day of a disease.——ENNEATICAL YEARS, every ninth year of a person's life.

EN'NUI (*Fr.*), a word expressive of lassitude, or weariness, arising from the want of employment.

ENS (*Lat.*), among Metaphysicians, denotes entity, being, or existence: this the schools call *ens reale* and *ens positivum*, to distinguish it from their *ens rationis*, which exists only in the imagination.

EN'SEMBLE (*Fr.*), a term used in the fine arts to denote the general effect of a whole work, without reference to the parts.

EN'SIFORM (*ensis*, a sword: *Lat.*), sword-shaped, applied by botanists to the leaves of the lily, iris, and similar plants.

EN'SIGN (*enseigne: Fr.*), the flag or banner under which soldiers are ranged, according to the different regiments to which they belong. Also, he who carries the colours; the lowest commissioned officer in a company of infantry.——A large flag hoisted on a staff, and carried over the poop or stern of a ship. A national ensign, hoisted with the upper corner downwards, is a signal of distress. Ships do not display their ensigns at sea, except on meeting strangers. In harbour, the ensign is not shown before 8 A.M. nor after sunset.

ENTAB'LATURE (*entablement: Fr.*), the horizontal continuous work which rests upon a row of columns. It consists of the *architrave*, which is immediately over the columns; the *frieze* over this; and the *cornice*, which is the uppermost portion.

ENTAIL (*entailler*, to notch: *Fr.*), in Law, a restriction regarding the alienation of lands and tenements, by one on whom they had been settled with a limitation to a particular class of heirs. Estates tail are *general*, where only one person's body is specified from which the issue must be derived; *special*, where both the progenitors are marked out. Estates tail being contrary to the general policy of the law, modes were invented in early times to destroy the special limitations of the gift, and create an estate in fee simple, without forfeiture being incurred. This was formerly done by the fiction of *common recoveries;* but the more simple means of an ordinary deed of conveyance, duly enrolled, was substituted by 3 & 4 Will. IV. c. 74. By such a deed a tenant in tail in possession (but not a tenant for life), may cut off the entail, and bar all the remainders over. The tenant for life in possession, and the tenant in tail in remainder, frequently join in executing a deed of this description for the purpose of resettling the estate.

ENTA'SIS (a stretching in: *Gr.*), in Architecture, a nearly imperceptible swelling in the middle of the shaft of a column, found in almost all Grecian examples, and preventing them from being strictly frusta of cones.

EN'TE (*Fr.*), in Heraldry, an epithet signifying grafted or engrafted.

ENTERI'TIS (*enteron*, the intestines: *Gr.*), in Medicine, inflammation of the intestines; a disorder always accompanied by considerable danger, and consequently requiring immediate attention.

EN'TEROCELE (*enteron*, the intestines; and *kēlē*, a tumour: *Gr.*), in Surgery, a rupture of the intestines.

ENTEROL'OGY (*enteron*, the intestines; and *logos*, a discourse: *Gr.*), a treatise or discourse on the internal parts of the body.

ENTEROM'PHALOS (*enteron*, the intestines; and *omphalos*, the navel: *Gr.*), an umbilical or navel rupture.

ENTHYME'ME (*enthumēma*: from *en*, in; and *thumos*, the mind: *Gr.*), in Logic, an argument having only one premiss of a syllogism expressed. Thus, 'All men are fallible; therefore so is the pope,' is an enthymeme. The whole syllogism would be, 'All men are fallible; the pope is a man; therefore the pope is fallible.'

ENTI'RETY, in Law, the whole of a thing, in distinction from a part.

ENTOMOL'OGY (*entoma*, insects; and *logos*, a discourse: *Gr.*), that branch of Zoology which treats of insects, a division of articulated animals having their bodies in three distinct portions, head, thorax, and abdomen; antennæ on the head; three pairs of legs; usually one or two pairs of wings, and aerial respiration. Thus defined, spiders, centipedes, worms, and crustaceans are all excluded from the class of Insects. This class is divided by entomologists into 15 orders, viz.:—1. *Coleoptera*, the immense order of beetles. 2 *Euplexoptera*, earwigs. 3. *Orthoptera*, grasshoppers, locusts, crickets, &c. 4. *Thysanoptera*, thrips insects. 5. *Neuroptera*, dragon flies, May-flies, &c. 6. *Trichoptera*, caddice flies. 7. *Hymenoptera*, bees, wasps, &c 8. *Strepsiptera*, bee parasites. 9. *Lepidoptera*, butterflies and moths. 10. *Homoptera*, cicadas, lantern flies, &c. 11. *Heteroptera* (or *Hemiptera*), bugs. 12. *Aphaniptera*, fleas. 13 *Diptera*, two-winged insects, such as the house-fly, blue-bottle-fly, &c. 14. *Anoplura*, parasites. 15. *Thysanura*, spring-tails, &c. The soft parts of insects are protected by an integument, which has sometimes been termed an external skeleton. To this the different muscles are attached. The body is usually composed of thirteen segments; some, however, are frequently soldered together so as to form one piece, whilst others are much reduced in size, and concealed under the adjacent ones. The head forms the first segment. Here are the antennæ, the eyes, and the mouth, which last organ is so greatly varied in structure that, in some of the orders, it is taken as a guide in the classification. In an ordinary biting insect, the mouth is thus composed: above, there is a small horny plate, called the *labrum*, forming the upper lip; below, there is a pair of horny *mandibles*, one on each side of the orifice, and the principal agents in gnawing; behind these there is a second pair of jaws, called *maxillæ*, composed of several pieces, and to the outside of each maxilla is a jointed organ of touch, called a *palpus*. Sometimes there is a second pair of palpi. The lower lip of the mouth is formed by the *labium*, consisting of two parts, the *mentum*, or chin, and the *ligula*, or tongue, and bearing another pair of palpi. Instead of this apparatus for biting, many insects possess an organ for sucking The moths and butterflies, the two-winged flies, the bugs, and many other tribes, are furnished with a suctorial apparatus infinitely varied. The eyes of insects are compound, that is, they consist of a number of eyes grouped together, each showing itself as a six-sided facet. In the eye of the common house-fly there are 4000 facets, in some of the butterflies 17,000 facets compose an eye, and in a small beetle, 25,000. The second, third, and fourth body segments of an insect form the *thorax*, and these are usually separate, when the parts are styled the *prothorax* (the first of them), the *mesothorax*, and the *metathorax* (the last of them); but sometimes they are completely united. The under side of the thorax is called the *sternum*. The organs of motion are attached to the thorax, three pairs of legs, and the wings when they are present. Each pair of legs is attached to a segment of the thorax, and each leg is divided into five parts, the last part, the *tarsus* or foot, being usually composed of from three to five joints. It is by the number and relative size of the tarsi that the order of Coleoptera is divided into sections. One or more hooked claws are attached to the last joint of the tarsus, and in several insects there is also a pair of soft pads called *pulvilli*. The wings, when present, are attached to the upper side of the thorax, the first pair to the mesothorax, the second pair to the metathorax. The wings consist of two membranes in close contact with veins, or nervures, between them. The wings of many insects are quite naked, but in others they are densely covered with scales, which are so minute that their shape can only be made out with the help of the microscope. The abdomen is composed normally of nine segments, but all of these are seldom visible, some being usually modified or concealed underneath others. At the hinder end of the abdomen of female insects, there is often an instrument called an *ovipostor*, for depositing their eggs. The blood of insects is nearly colourless. Its oxygenation is effected by numerous minute tubes, called *tracheæ*, which convey the atmospheric air that enters through apertures, termed *stigmata*, or *spiracles*, to every part of the body. Nearly all insects are produced from eggs, and these eggs are frequently curiously covered with a pattern of raised lines. After leaving the egg, the great majority of insects undergo a series of transformations, the first stage of which resembles a worm. In this, the larval state, they are called *caterpillars*, *grubs*, or *maggots*, the first name being usually applied to those that feed on the outside of plants, the second to those that burrow inside plants on or in the ground, and the third to those that are destitute of feet and a visible head. This is the state in which insects do so much damage to plants, furniture, clothes, furs, &c. After feeding voraciously, and casting its skin several times, the larva passes into the quiescent state of an *aurelia*, *chrysalis*, or *pupa*. From this it emerges as the perfect insect, to flit about for a few hours or days, copulate, lay eggs, and die. This is the series of changes which constitutes a *complete metamorphosis;* but many insects undergo an incomplete metamorphosis, being hatched nearly in the form of the parents, but without wings, which they acquire subsequently; and other insects undergo no metamorphosis at all. In some tribes, the male and female closely resemble each other, but in others the female is wingless and the male winged [see COCCUS], and in other tribes there are not only male and female forms, but neuters, all living together in colonies. [See ANTS and BEES.]

ENTOMOS'TRACA (*entoma*, insects; *ostrakon*, a shell: *Gr.*), a division of the class *Crustacea*, consisting of minute animals, which haunt stagnant freshwater and pools on the sea-shore. They are covered with a shell of a horny or leathery texture, and formed of one or two pieces. In some this covering is buckler-shaped, in others it has the appearance of a bivalve shell. They change their shells as they grow, and this change, in some cases, amounts to a kind of transformation. Some of the commoner entomostraca are popularly known as *water-fleas*. Many fossil species have been discovered.

ENTOZO'A (*entos*, within; and *zōon*, an animal: *Gr.*), an extensive series of low-organized, invertebrate, and generally vermiform animals, most of which are parasitic on the internal organs of other animals. Their colourless blood circulates in the higher organized species in a closed system of vessels, without auricle or ventricle. They possess no respiratory organs, no articulated members for locomotion, and they have no organs of sense. Their digestive system consists either of tubes or cavities without an anal outlet, and excavated in the parenchymatous texture of the body; or of a tube with both oral and anal orifices, freely suspended in the abdominal cavity. In those which are more highly organized, a filamentary nervous system has been detected, sometimes having a ganglion near the mouth. The generative system is unisexual, hermaphrodite, or diœcious. They are of various shapes, some being short and cylindrical, others long and ribband-like, such as the *Tænia solium*, the common tape-worm. Some adhere by means of sucking disks, others by the hooks with which their mouths are armed. Fourteen species of these pests have been found in the human body, some growing to an extraordinary length, and most possessing wonderful powers of reproduction.

ENTREMETS' (a by-dish: *Fr.*), small and delicate dishes, set between the principal ones at table.——In Music, the inferior movements inserted in a composition between those of more importance.

ENTREPA'S (a broken pace: *Fr.*), in Horsemanship, a short broken pace, nearly resembling an amble.

ENTREPO'T (*Fr.*), a warehouse or magazine, for the deposit of goods which are intended for re-exportation, and which therefore pay no duty. It is synonymous with what, on the continent, is termed a *free port*, and in this country a *bonded warehouse*. It is understood popularly as a port which exports the productions of the country around it, and imports what is necessary for the supply of the same.

EN'TRY (*entrée*, an entrance: *Fr.*), in Law, the act of taking possession of lands and tenements, where a man has title of entry. Also, a writ showing that the tenant commenced possession in an unlawful way, and thus disproving his title.——In Commerce, the act of setting down in an account book the particulars of trade. Book-keeping is performed by either *single* or *double entry*.——ENTRY, at the custom-house, the exhibition or deposit of a ship's papers in the hands of the proper officers, and obtaining permission to land the goods.

ENUMERA'TION (*enumeratio*, a counting up: *Lat.*), an account of several things, in which mention is made of every particular article.——ENUMERATION, in Rhetoric, is that part of a peroration in which the orator recapitulates the principal points or heads of the discourse or argument.

ENUR'NEY, in Heraldry, an epithet for a bordure charged with wild beasts.

EN'VELOPE (*enveloppe: Fr.*), in Fortification, a small rampart of earth, with a parapet

ENVIRON'NE', in Heraldry, surrounded with other things: thus, a lion is said to be *environné* with so many bezants.

EN'VOY (*envoyé: Fr.*), a person deputed by a government to negotiate some affair with a foreign prince or state. There are envoys *ordinary* and *extraordinary*, as well as ambassadors; they are equally under the protection of the law of nations, and enjoy all the privileges of ambassadors: but, being in rank below them, they are not treated with equal ceremony. The word *envoy* is also sometimes applied to resident ministers.

E'OCENE (*ēōs*, the morning; and *kainos*, new: *Gr.*), in Geology, the oldest formation of the *tertiary* or *supercretaceous* group of rocks, containing the least amount of organic remains belonging to living species of animals; and therefore indicating the dawn, as it were, of the present state of animal creation. Eocene strata have been divided into three formations, upper, middle, and lower. The first and second include various beds developed in the Isle of Wight and Hampshire. To the lower eocene belong the strata of the London basin, from the London clay proper to the sands of Thanet, which rest upon the chalk.

E'PACT (*epaktos*, supplemental: *Gr.*), in Chronology, the moon's age at the end of the year; or the number of days by which the last new moon has preceded the beginning of the year. The annual epact is 11 days, the common solar year being 365 days, and the common lunar year 354. In the calendar of the Church of England, Easter and other movable feasts are determined in the same way as in the Roman Catholic, except that the golden numbers are prefixed to the days of the full, instead of the new moons; and, therefore, epacts are not used.

EPAGO'GE (*epagōgē*, literally a bringing on: *Gr.*), in Rhetoric, a figure of speech, which consists in demonstrating universal propositions by particulars.

EPAN'ODOS (*Gr.*, literally a return), in Rhetoric, a figure, in which the same or similar words are used in two or more sentences.

EPAPHÆ'RESIS (*epaphairesis*, literally a second taking away: *Gr.*), in Medicine, a removal or taking away; applied particularly to repeated phlebotomy.

EP'ARCHY (*eparchia*, a province: *Gr.*), the prefecture or territory under the jurisdiction of an *eparch* or governor.

EPAU'LE (a shoulder: *Fr.*), in Fortification, the shoulder of the bastion, or the angle of the face and flank; which is often called the *angle of the epaule*.

EPAU'LEMENT (*Fr.*, from *épaule*, a shoulder), in Fortification, a work raised to cover laterally, made of earth, gabions, &c. It also denotes a mass of earth, called a *square orillon*, raised to cover the cannon of a casemate, and faced with a wall.

EPAULETT'E or **EP'AULET** (*Fr.*: from *épaule*, the shoulder), an ornamental badge, usually formed of gold lace, and worn on the shoulder by military and naval officers. In the English army, all commissioned officers wear two epaulettes. In the navy, masters and commanders have one epaulette on the left shoulder; post captains under three years, one epaulette on the right shoulder, afterwards two epaulettes; rear-admirals have one star on the strap of the epaulette, vice-admirals two stars, and admirals three stars.

EPEN'THESIS (*Gr.*), the insertion of a letter or syllable in the middle of a word; as, *alituum* for *alitum*.

E'PHAH or **E'PHA**, a Hebrew measure both for liquids and dry goods.

EPHE'LIS (freckles brought out by the sun: *Gr.*), in Medicine, a broad solitary or aggregated spot, on the face, back of the hand, or breast, arising from exposure to the sun.

EPHE'MERA (*ephēmeros*, living but a day: *Gr.*), a genus of neuropterous insects, so called from their living only about a day. [See DAY-FLY and MAY-FLY.]

EPHEM'ERIS (*Gr.*: from *epi*, on; and *hēmera*, a day), in Astronomy, a table or collection of tables, showing the daily state of the heavens, or the places in which all the planets are to be found every day at noon. It is from these tables that the eclipses, conjunctions, and aspects of the planets are calculated.——In Medicine, *ephemerides* were those diseases which were supposed to return at particular times of the moon.

EPHIAL'TES (*Gr.*, literally one who leaps upon), in Medicine, the incubus, or nightmare.

EPHIDRO'SIS (an after perspiration: *Gr.*), in Medicine, a violent and morbid perspiration.

EPH'OD (*Heb.*, from *aphad*, to clothe), an ornament or upper garment worn by the Jewish priests. It is supposed to have been a sort of girdle, which, being brought from behind the neck over the two shoulders, and hanging down before, was put across the stomach, then carried round the waist, and used as a girdle to the tunic.

EPH'ORI (*ephoroi*, literally overseers: *Gr.*), in Grecian Antiquity, magistrates established in ancient Sparta, to control all others, even the kings. The authority of the *ephori*, who were five in number, was very great: they judicially decided important causes, presided over shows and festivals, had the care of the public money, specially superintended the education of youth, and were the arbiters of war and peace. Ephori were common to many Dorian constitutions in very ancient times.

EP'IC (*epikos*, from *epos*, a verse: *Gr.*), or *heroic poem*, a poem narrating a story, which may be partly true or altogether fictitious, representing, in an elevated style, a series of striking events connected with the history of the human race or some of its nations. The great epic writers of antiquity are Homer and Virgil; among the moderns, Milton, Tasso, Camoens, Dante, and Ariosto.

EPICAN'THIS (*epi*, upon; and *kanthos*, the corner of the eye: *Gr.*), in Medicine, a tumour in the inner corner of the eye.

EPICHIRE'MA (*epicheireo*, I put my hand to: *Gr.*), in Logic, a mode of reasoning, which comprehends the proof of one or both the premises of a syllogism, before the conclusion is drawn.

EPICŒ'NE (*epikoinos*, literally common: *Gr.*), in Grammar, an epithet applied to those Greek and Latin words to which the masculine and feminine article may be indifferently attached.

EPICRA'NIUM (*epi*, upon; and *kranion*, the skull: *Gr.*), in Anatomy, the common integuments, aponeurosis, and expansion of the occipito-frontalis muscle, which lie upon the cranium; by some, it is considered to comprise only the last; and by others, to consist merely of the skin.

EPICURE'ANS, a numerous sect of philosophers in Greece and Rome, the disciples of *Epicurus*, who flourished about 300 years B.C. They maintained that the gratification of the senses ought to be man's chief aim; that the world was formed by a concourse of atoms, and not governed by Providence; that the gods resided in the extramundane spaces, in soft inactive ease, and eternal tranquillity; that future rewards and punishments were idle chimeras; and that the soul was extinguished with the body. They are mentioned in the seventeenth chapter of the Acts of the Apostles. The doctrines of *Epicurus* himself were more dignified than those held by the generality of his followers: he maintained, indeed, that pleasure was the chief end of human pursuit; and this pleasure he placed in an exemption from pain and a perfect tranquillity of body and mind; but the means which he pointed out as conducive to attain it were prudence temperance, fortitude, and justice, in the union of which perfect happiness consists. He pursued pleasure, therefore, in its most rational acceptation. He maintained that the pleasures and pains of the mind exceed those of the body, and that to obtain happiness it is necessary to rule our desires by the help of reason. He thought that the imperfections of the world exhibiting themselves in pain and misery were a sufficient proof that it could not have emanated from an intelligent cause, such an origin being, moreover, inconceivable and not reconcilable with the nature of the gods. What appear marks of design and contrivance are only fortuitous coincidences. The soul has a corporeal nature, but more refined than the body, and both perish together by the dissolution of their component atoms.

EPICY'CLE (*epikuklos*, literally upon a circle: *Gr.*), in Ancient Astronomy, a small circle whose centre is in the circumference of a greater.

EPICY'CLOID (*epikuklos*, an epicycle; and *eidos*, form: *Gr.*), in Geometry, a curve generated by a point in one circle, which revolves about another circle, either on the concavity or convexity of its circumference, and thus differs from the common cycloid, which is generated by the revolution of a circle along a right line.

EPI'DEMIC (*epi*, upon; *demos*, the people: *Gr.*). [See ENDEMIC.]

EPIDEN'DRA (*epi*, upon; and *dendron*, a tree: *Gr.*), in Botany, a term sometimes used for plants which grow on other plants; as the mistletoe, dodder, &c.

EPIDER'MIS (*Gr.*: from *epi*, upon; and *derma*, the skin), in Anatomy, the cuticle or scarf skin; a thin membrane covering the *cutis*, or true skin of animals. In plants this name is given to a skin which lies under the superficial pellicle, and covers all parts of the plant except the stigma.

EP'IDOTE, a mineral, found crystallized in rhombic prisms variously modified, both laterally and at its extremities. Its colour is usually some shade of green. It is composed of silica and alumina with other bases. There are several varieties, one of which, *Zoizite*, contains lime; *Tremolite* contains lime and magnesia. Fine crystals, two or three inches in length, and between one and two in diameter, are found at Arendal, in Norway, and have received the name of *Arendalite;* but they are not much esteemed in jewellery.

EPIGAS'TRIC (*epigastrion*, the region from the breast to the navel: *Gr.*), pertaining to the upper part of the abdomen.—EPIGASTRIC VESSELS, the arteries and veins belonging to the *epigastric region;* the former being branches of the cœliac artery, and the latter of the iliac veins.

EP'IGENE (*epigenēs*, after-growing: *Gr.*), a term applied to forms of crystals not natural to the substances in which they are found.

EPIGLOT'TIS (*Gr.*: from *epi*, upon; and *glōtta*, the tongue), in Anatomy, one of the cartilages of the larynx: its use is to cover the glottis when food or drink is passing into the stomach, to prevent it from entering the larynx and obstructing the breath.

EP'IGRAM (*epigramma*, an inscription *Gr.*), a short composition in verse, treating only of one thing, and ending with some lively, ingenious, and natural thought or point. From its concise and expressive character, it is well fitted for satire; but an epigram may be didactic, satiric, comic, lyric, or elegiac. Originally, epigrams were inscriptions on tombs, statues, temples, triumphal arches, &c.

EP'IGRAPH (*epigrapho*, I inscribe: *Gr.*), a quotation from an author, or a sentence written for the purpose, placed at the commencement of a work, or of a division.

EP'ILEPSY (*epilēpsia*, from *epilambano*, I lay hold of: *Gr.*), a disease which deprives the patient of sensation and volition, accompanied by involuntary contraction of the muscles. It is popularly called the falling sickness, because those who are attacked by it fall suddenly to the ground.

EPILO'BIUM, in Botany, a genus of plants, nat. ord. *Onagraceæ.*

EP'ILOGUE (*epilogos: Gr.*), in the Drama, a speech addressed to the audience when the play is ended. In modern tragedy, the epilogue is usually smart and lively, being intended to compose the strong feelings which may have been raised in the course of the representation.—In Rhetoric, the conclusion of a speech, containing a recapitulation of the whole.

EPINI'CION (*epinikion:* from *epi*, upon; and *nikē*, a victory: *Gr.*), in Greek and Latin poetry, a poem or composition celebrating a victory. Also, a festival on account of a victory.

EPIPH'ANY (*epiphania*, literally a manifestation: *Gr.*), a Christian festival observed on the 6th of January (the twelfth day after Christmas), in commemoration of Christ being manifested by the miraculous appearance of a star to the magi, or wise men, who came to adore him and bring him presents. In some countries the day is styled the day of the kings. The Greek fathers applied the word to the appearance of Christ in the world, the sense in which St. Paul uses it, 2 Tim. i. 10.

EPIPHONE'MA (*epiphōnēma*, an exclamation: *Gr.*), in Rhetoric, a sententious exclamation or remark, not closely connected with the general tenor of the oration, and usually expressed with vehemence; or a sentence added as a conclusion to a speech.

EPIPH'ORA (*Gr.*, from *epiphero*, I lay upon), in Rhetoric and Poetry, an emphatic repetition of a word, or a series of words, at the end of several sentences or stanzas.—In Medicine, a morbid defluxion of the eyes.

EPIPH'YSIS (*epiphusis*, an aftergrowth: *Gr.*), in Anatomy, a bony substance, or as it were a smaller bone, affixed to a larger or principal bone by a cartilage.

EPI'PHYTE (*epi*, upon; and *phuton*, a plant: *Gr.*), a plant which has its home upon another plant. In the forests of Brazil, the trunks and branches of the trees are covered, not with mosses and lichens, but with orchids, cacti, arums, and other plants of epiphytous habits. Most of these derive their nourishment from the moisture of the bark of the tree on which they are seated, or on the decayed matter of lowlier forms of vegetation, but some are truly parasitical, that is, their roots penetrate into the tree and feed upon its juices.

EPIPLEX'IS (*epiplēxis*, a chastisement: *Gr.*), a Rhetorical figure, which, by an elegant kind of upbraiding, endeavours to convince.

EPIP'LOCE (*epiplokē*, a plaiting together: *Gr.*), a Rhetorical figure, by which one aggravation, or striking circumstance, is added to another; as, 'He not only spared the rebels, but encouraged them; not only encouraged, but rewarded them.'

EPIP'LOCELE (*epiplokēlē*: from *epiploon*, the omentum; and *kēlē*, a rupture: *Gr.*), in Surgery, a rupture of the omentum.

EPIP'LOON (the omentum: *Gr.*), in Anatomy, the omentum or caul.

EPIR'RHEOLOGY (*epirreo*, I influence; and *logos*, a discourse: *Gr.*), a branch of botany treating on the influence of external agents on plants.

EPIS'COPACY (*episcopos*, literally an overseer: *Gr.*), the form of church government which includes bishops.

EPISCOPA'LIANS (same *deriv.*), an appellation given to those who adhere to the episcopal form of church government and discipline. Until the Test Act was repealed, none but episcopalians, or members of the Church of England, were qualified to fill any office, civil or military.

EP'ISODE (*epeisodion*: from *epi*, at; and *eisodos*, an entrance: *Gr.*), in Poetry, a minor story which a poet adds to the main story of the piece by way of giving variety. The story of Dido, in the Æneid, the story of Dorothea, in Don Quixote, and the loves of Lorenzo and Jessica, in the Merchant of Venice, form episodes in the respective pieces. In epic poetry, there is much more room for the episode than in dramatic, where the poem is confined to a present action. The term *episode* has also been transferred to historical painting, in a sense analogous to that which it bears in poetry.

EPISPAS'MOS (*Gr.*), in Medicine, a quick inspiration of the breath.

EPISPAS'TIC (*epispastikos*, attracting: *Gr.*), in Medicine, a blister, or a topical remedy for attracting the humours of the skin.

EPISTAX'IS (*epistazo*, I trickle: *Gr.*), in Medicine, a repeated bleeding from the nose.

EPIS'TROPHE (*epistrophē*, a return: *Gr.*), in Rhetoric, a figure of speech in which several successive sentences end with the same word or affirmation, as, 'Are they Hebrews? so am I. Are they Israelites? so am I. Are they of the seed of Abraham? so am I,' &c.

EP'ISTYLE (*epistulion*: from *epi*, upon; and *stulos*, a column: *Gr.*), in Ancient Architecture, a term used by the Greeks for what we call the *architrave*, viz. a massive piece of stone, &c., laid immediately over the capital of a column.

EP'ITAPH (*epitaphion*: from *epi*, upon: and *taphos*, a tomb: *Gr.*). The Romans inscribed their epitaphs, which sometimes were full of moral sentiments, to the *manes* (*diis manibus*); and frequently introduced the dead as speaking to the living. During the first twelve centuries of the Christian era, monumental inscriptions in this country were written in Latin. French was adopted about the 13th century, and the vernacular tongue began to be used from the middle of the 14th; but the learned have continued to prefer the Latin.

EPITA'SIS (*Gr.*, literally a stretching), in Ancient Poetry, the second part or division of a dramatic poem, in which the plot, entered upon in the first part, or *protasis*, was carried on, and worked up, till it arrived at its height, called *catastasis*.——In Medicine, an increase of the paroxysm of a fever.——In Rhetoric, that part of an oration in which the orator addresses himself most forcibly to the passions.

EPITHALA'MIUM (*epithalamion*: *Gr.*), a nuptial song, or poetical composition in praise of the bridegroom and bride, with wishes for their prosperity. Among the Greeks and Romans, it was sung by young men and maids at the door of the bridal chamber. Amongst the poems of Ben Jonson and other poets of the time of Elizabeth and James, will be found several specimens of epithalamia.

EP'ITHEM (*epithema*, a cover: *Gr.*), in Medicine, any external application used as a fomentation.

EPIT'OME (*epitomē*, a cutting short: *Gr.*), a brief summary or compendium, containing the substance or principal matters of a book. To *epitomize*, therefore, is to shorten a literary production by judicious abridgment

EPIT'ROPE or EPIT'ROPY (*epitropē*, a surrender: *Gr.*), in Rhetoric, a figure of speech, by which something is granted with a view to obtain an advantage, as, 'I concede the fact, but this very concession overthrows your own argument.'

EPIZEUX'IS (a joining: *Gr.*), in Rhetoric, a figure which repeats the same word, without any other intervening: such is that of Virgil, 'nunc, nunc, insurgite remis.'

EPIZO'OTY (same *deriv.*), a pestilence among brutes.

E'POCH (same *deriv.*), a certain fixed period, or point of time, made famous by some remarkable event, and serving as a standard in chronology and history. An epoch is the *commencement of an era*. [See Era.]

EP'ODE (*epōdē*: from *epi*, upon; and *ōdē*, an ode: *Gr.*), in Lyric Poetry, the third or last part of the ode, the ancient ode being divided into strophe, antistrophe, and epode The word is now used for any short verse or verses, that follow one or more greater: thus, the epodes of Horace are supplementary odes.

EPOPEE' or EPOPŒ'IA (*epopoiia*: from *epos*, a discourse; and *poieo*, I make; *Gr.*), in Poetry, the fable, or subject of an epic poem.

EPOP'TÆ (*epopteuo*, I inspect: *Gr.*), in Antiquity, a name given to those who were admitted to view the secrets of the greater mysteries, or religious ceremonies of the Greeks.

EPO'TIDES (*Gr.*: from *epi*, upon; and *ōta*, the ears: *Gr.*), in ancient Naval Architecture, two thick blocks of wood, one on each side the prow of a galley, for warding off the blows of the rostra of the enemy's vessels. They had somewhat the appearance of ears; hence the name.

EPROUVETTE' (*Fr.*), the name of an instrument for ascertaining the strength of gunpowder, or comparing the strength of different kinds of gunpowder. It consists of a small gun which is fastened to a frame, and is capable of swinging on a horizontal axis. When this gun is fired, the recoil moves the frame; and the arc through which it passes shows the strength of the powder

EP'SOM SALTS, in Chemistry, sulphate of magnesia, which was formerly procured by boiling down mineral water from the spring at Epsom.

EPULO'TIC (*epoulōtikos*, from *epoulos*, I cicatrize: *Gr.*), in Medicine, an application for cicatrizing and healing wounds or ulcers, or disposing the parts to recover soundness.

EQUA'TION (*equatio*, a making equal: *Lat.*), in Mathematics, a statement of a relation of equality between two functions of a magnitude Thus $a^2 + b = x$, and $b - c = y$, are simple forms of equations An equation is the basis of all mathematical investigation. [See ALGEBRA]——EQUATION, in Astronomy, a term used to express the quantity added to, or subtracted from, the mean position of a heavenly body to obtain the true position.——EQUATION OF PAYMENTS, in Arithmetic, a rule for finding a time when, if a sum be paid which is equal to the sum of several others due at different times, no loss will be sustained by either party——EQUATION OF TIME, the reduction of the apparent time or motion of the sun to equable, mean, or true time The difference between true and apparent time arises from the excentricity of the earth's orbit, the obliquity of the ecliptic, and the perturbations of the moon and planets, which sensibly affect the sun's motion in longitude.

EQUA'TOR (*æquo*, I make equal: *Lat.*), in Astronomy and Geography, a great circle of the terrestrial globe, equidistant from its poles, and dividing it into two hemispheres, one north and the other south It is called the *equator*, because, when the sun is over it, the days and nights are of *equal* length; hence it is called also the *equinoctial*, and, when drawn on maps and globes, the *equinoctial line*, or by mariners simply *the line* All places through which it passes have invariably equal days and nights It crosses the centre of Africa, the islands of Sumatra, Borneo, Celebes, &c., in Asia; then traverses the Pacific Ocean; and, having gone through South America, by Quito and the mouth of the Amazon, proceeds by the Atlantic back to Africa——To *cross the line*, in Navigation, is to pass over the equator

EQUATO'RIAL, an astronomical instrument, contrived for the purpose of directing a telescope to any celestial object, of which the right ascension and declination are known; and of keeping it in view, notwithstanding the diurnal motion.

E'QUERRY (*écuyer*: *Fr.*), in this country, an officer of state under the master of the horse. The chief equerry is styled the *Clerk Marshal*: there are four equerries in ordinary, and an equerry of the crown stable. Their duties are to accompany the sovereign on horseback when taking exercise, &c.

E'QUES AURA'TUS (a gilded knight: *Lat.*), a *knight bachelor*, so called because none but knights were allowed to gild their armour

EQUES'TRIAN OR'DER, in Roman Antiquity, the second rank in Rome, and the next to that of the senators. [See EQUITES.]

EQUIAN'GULAR (*æquus*, equal; and *angulus*, an angle: *Lat.*), in Geometry, a term applied to figures whose angles are all equal; thus, to a square, an equilateral triangle, a parallelogram, &c

EQUICRU'RAL (*æquus*, equal; and *crus*, a leg: *Lat.*), in Geometry, having equal legs, but longer than the base; as, an *equicrural triangle* Such triangles belong to the species termed *isosceles*.

EQUIDIF'FERENT (*æquus*, equal; and *differentia*, a difference: *Lat.*), in Mathematics, a term applied to such things as have equal differences, or are arithmetically proportional.——In Crystallography, having a different number of faces presented by the prism and by each summit; but their numbers form a series in arithmetical progression, as 6, 4, 2

EQUILAT'ERAL (*æquilateralis*: from *æquus*, equal, and *latus*, a side: *Lat.*), in Geometry, having all the sides equal; as an *equilateral triangle*.

EQUIL'IBRIST (from *next*), one who keeps his balance in unnatural positions and hazardous movements, entertaining the spectator by his skilful motions and varying attitudes Equilibrists are very common in the East, and their feats are truly surprising.

EQUILIB'RIUM (an even balance: *Lat.*), in Statics, a state in which two or more forces balance each other, that is, counterbalance each other's effect, so as to leave the body at rest——In the Fine Arts, the due combination of light, shadow, &c.

EQUIMUL'TIPLE (*æquus*, equal; and *multiplex*, manifold: *Lat.*), in Arithmetic and Geometry, one of two or more numbers multiplied by the same number or quantity. Hence *equimultiples* are always in the same ratio to each other as the simple numbers or quantities before multiplication. Thus, if 2 and 3 are multiplied by 4, the multiples 8 and 12 will be to each other as 2 and 3.

EQUINOC'TIAL (*æquinoctialis*, from *æquinoctium*, the equinox: *Lat.*), in Astronomy, a great circle of the sphere, under which the equator is situated It is so called, because, whenever the sun comes to it, the days and nights are equal all over the globe; as it is the circle which the sun seems to describe at the time of the two equinoxes of spring and autumn——EQUINOCTIAL POINTS, the two points, Aries and Libra, where the equinoctial and ecliptic cross each other.——EQUINOCTIAL COLURE, the great circle passing through the poles of the sphere and the equinoctial points

E'QUINOX (*æquinoctium*: from *æquus* equal, and *nox*, night: *Lat.*), in Astronomy, the time when the sun enters either of the equinoctial points, where the ecliptic intersects the equinoctial. When the sun is in this situation, the horizon of every place is divided into two equal parts by the circle bounding light and darkness: hence the sun is visible everywhere 12 hours, and invisible for the same time, in each 24 hours. As the sun is in one of them in the spring (about March 21), it is called the *vernal* equinox; and as it is in the other in autumn (about September 23), it is called the *autumnal* equinox. At all other times, except under the line, the lengths of the day and night are unequal, and their difference is the greater the nearer we approach either pole; but in the same latitude their relative lengths are everywhere the same. Under the line this inequality entirely vanishes; there, during the day, which is equal to the night, the sun always ascends six hours, and descends six hours.

EQ'UIPAGE (*Fr.*), the furniture of an army or body of troops, infantry or cavalry, including whatever is necessary for a military expedition. Camp equipage includes tents, and everything required for accommodation in camp. Field equipage consists of arms, artillery, wagons, tumbrils, &c.——When we speak of a body of troops being furnished with arms and warlike apparatus, we say they are *equipped* for service.

EQUIPOL'LENCE (*æquipollens*, equivalent: *Lat.*), in Logic, an equivalence or agreement in the grammatical sense of any two or more propositions; that is, when they signify one and the same thing, though they express it differently.

EQUI'RIA (*equus*, a horse: *Lat.*), in Antiquity, games which were instituted by Romulus in honour of Mars, and consisted in horse-racing. They were celebrated every year, and if the Campus Martius happened to be overflowed by the Tiber, they were solemnized on the *Mons Cœlius*, which was thence called *Martialis Campus.*

EQUISE'TUM (*Lat.*), in Botany, a genus of cryptogamic plants: nat. ord. *Equisetaceæ*. The species are common in marshy places, and are known as horsetail.

EQ'UITANT (*equito*, I ride: *Lat.*), in Botany, a term used in the foliation of plants, for leaves that ride, as it were one over another.

EQ'UITES (*Lat.*), among the Romans, the *knights*, who constituted the second degree of nobility, and immediately succeeded the senators in point of rank. They were ordinarily the cavalry of the Roman state: at first their number was only 300. They received a horse or money to purchase it, and its maintenance from the treasury; but subsequently a class of knights was instituted who found their own horses, but received pay. Ultimately, all who possessed the property which qualified for knighthood, that is 400 sestertia, or about 3,200*l.*, were considered *equites;* but the dignity of the order was then greatly lessened. The badge of equestrian rank was a ring, which was given by the state.

EQ'UITY (*æquitas: Lat.*), a branch of jurisprudence. Blackstone says, 'Since the laws in all cases cannot be foreseen or expressed, it is necessary that, when the general decrees of the law come to be applied to particular cases, there should be somewhere vested a power of defining those circumstances which (had they been foreseen) the legislator himself would have expressed.' The English judges have constantly assumed the authority to pronounce c [illegible] be within the 'equity,' as it is termed, of statutes or rules, when they are not within its words. But, at present, the word *equity* is applied to a separate body of law, created and sustained on the strength of precedents, and administered by tribunals distinct from the common law courts of the country. Equity, then, is the law administered by the judges of the court of chancery giving remedy in cases to which the courts of law are not competent. It will remove legal impediments to the fair decision of a question pending at law. It will prevent a party from improperly setting up at a trial some title or claim which would be inequitable. It will compel him to discover, on his own oath, facts which he knows are material to the right of the other party, but which a court of law cannot compel the party to reveal. It will provide for the safety of property in dispute, pending litition. It will counteract, control, or set aside fraudulent judgments. It will also exercise, in many cases, *exclusive* jurisdiction; particularly in granting special relief, beyond the reach of the common law. It will grant injunctions to prevent waste or irreparable injury, or to secure a settled right, or to prevent vexatious litigation, or to compel the restitution of title deeds; it will appoint receivers of property, where it is in danger of misapplication; it will prohibit a party from leaving the country in order to avoid a suit; it will decree a specific performance of contracts respecting real estates; it will in many cases supply the imperfect execution of instruments, and reform and alter them according to the real intention of the parties; it will grant relief in cases of lost deeds and securities; and in all cases in which its interference is asked, its general rule is, that he who asks equity must do equity. The court of chancery requires the defendant to put in, on his oath, a written answer to the plaintiff's charge. [See CHANCERY.]

EQ'UITY OF REDEMP'TION, in Law, the right which a mortgagee has in a court of equity to redeem the mortgaged property on repayment of the money borrowed, and interest thereon. Such a right exists, notwithstanding the expiration of the time mentioned in the deed for repayment, until the mortgagee has obtained a decree of foreclosure, that is, a decree depriving the mortgagee of his right to redeem. Although at law the estate on non-payment of the money at the date mentioned on the deed becomes vested in the mortgagee, yet in equity it is still considered only a pledge for the money.

EQUIV'ALENTS (*equivalens*, having equal power: *Lat.*), a term employed in Chemistry to express the proportional weight or quantity of any substance which is necessary to saturate any other with which it can combine. The following is a table of the chemical equivalents or atomic weights of the elementary substances, hydrogen being considered as unity:—

Name.	*Symb.*	*Equiv.*	*Sp. Grav.*
Aluminium	Al	13·67	2·56
Antimony	Sb	129·00	6·70
Arsenic	As	75·00	5·67
Barium	Ba	68·50	4·70
Bismuth	Bi	213·09	9 80
Boron	B	11·00	2·68
Bromine	Br	80·00	5·411
Cadmium	Cd	56·00	8·63
Cæsium	Cæ	133·00	
Calcium	Ca	20·00	1·58
Carbon	C	6·00	0·829
Cerium	Ce	46·00	
Chlorine	Cl	35·50	2·453
Chromium	Cr	26·27	5·90
Cobalt	Co	29·50	8·53
Copper	Cu	32·00	8·72
Didymium	D	68 00	
Erbium	E		
Fluorine	Fl	19·00	1·327
Glucinum	G	6·97	
Gold	Au	98 33	19·5
Hydrogen	H	1·00	0 0692
Ilmenium	Il		
Indium			
Iodine	I	127·00	8·7827
Iridium	Ir	98·56	18·63
Iron	Fe	28·00	7·84
Lanthanum	La		
Lead	Pb	104·00	11·30
Lithium	L	7·00	0·5936
Magnesium	Mg	12·00	1·75
Manganese	Mn	26·00	8·00
Mercury	Hg	100·00	13·50
Molybdenum	M	48·00	8·60
Nickel	Ni	29·50	8·63
Niobium	Nb		
Nitrogen	N	14·00	0 9713
Norium	No		
Osmium	Os	98·41	10·00
Oxygen	O	8·00	1·1056
Palladium	Pd	53·24	11·50
Pelopium			
Phosphorus	P	32·00	4·284
Platinum	Pt	99·00	21·50
Potassium	K	39·00	0·865
Rhodium	Ro	52·16	11·20
Rubidium	Rub		
Ruthenium	Ru	52·11	8·60
Selenium	Se	40·00	7·696
Silicon	Si	21·00	
Silver	Ag	108·00	10·43
Sodium	Na	23·00	0·97
Strontium	Sr	44·00	2·54
Sulphur	S	16·00	2·214
Tantalum	Ta		
Tellurium	Te	64·08	6·30
Terbium	Tb		
Thallium	Tl		
Thorium	Th	59·50	
Tin	Sn	59·00	7·29
Titanium	Ti	24·12	5·28
Tungsten	W	92·00	17·5
Uranium	U	60·00	10 15
Vanadium	V	63·46	
Yttrium	Y		
Zinc	Zn	32·52	6·91
Zirconium	Zr	33·58	

EQUIV'OCAL (*equivocus*, ambiguous: *Lat.*), in Logic, a word that has several significations, and is, therefore, applicable to different objects, is said to be equivocal. A word is employed equivocally in a syllogism when the middle term is used in different senses in the two premises.

EQ'UIVOQUE (*Fr.*), a word or phrase susceptible of different significations.

ERA'DIATION (*e*, from; and *radiatio*, a sending forth of rays: *Lat.*), emission of rays of light, heat, &c.

ERAD'ICATED (*eradico*, I pluck up by the roots: *Lat.*), in Heraldry, an epithet for a tree or plant torn up by the root.

ERA'SED (*raser*, to erase: *Fr.*) in Heraldy, an epithet for the head or limb of any creature violently torn from the body, so as to give it a jagged appearance.

ER'EBUS (*erebos: Gr.*), according to Homer, this was a dark region under the earth, through which was the passage to Hades, the abode of departed souls.——Also, in Greek Mythology, a son of chaos, to whom Night bore Æther and Day.

ERECT' (*erectus*, upright: *Lat.*), in Botany, an epithet for a stem, leaf, or flower, &c.: as, *erectus caulis*, a stem standing perpendicularly from the ground; *flos erectus*, an erect flower, or one which has its aperture directed upwards, &c.——In Heraldry, an epithet for anything upright, or perpendicularly elevated, as wings *erect*, &c.

EREMACAU'SIS (*erēmos*, waste; *kausis*, burning: *Gr.*), a term applied by some chemists to that process of decay which takes place in moist organic substances, when freely exposed to the air; putrefaction being limited to decomposition under water. One theory as to the origin of the diamond is, that it was formed from an organic compound by a process of eremacausis.

EREMIT'ICAL (*eremos*, a desert: *Gr.*), living in solitude or in seclusion from the world.

ER'GOT (*Fr.*), in Farriery, a stub, like a piece of soft horn, situated behind and below the pastern joint.——Also, a diseased condition of rye and other grains, by which the ovary assumes the form of a long spur, and becomes of a dark colour. This is caused by a minute fungus. The eating of such diseased grain has been known to produce a dreadful disease; nevertheless, it is sometimes administered medicinally.

ERICA'CEÆ, a nat. ord. of exogenous plants, with evergreen leaves and monopetalous flowers. They are not of much use to man, but several genera bear very handsome flowers, such as the genera *erica* (the heaths, which contains some hundreds of species), rhododendron, azalea, and kalmia. The heaths abound at the Cape of Good Hope; the rhododendrons in the Himalayas and in North America.

ERIOM'ETER (*erion*, wool; and *metron*, a measure: *Gr.*), an instrument for measuring the fibres of wool, silk, &c.

ER'MINE (from *Armenia*), the *Mustela erminea* of zoologists, an animal of the weasel tribe, between nine and ten inches in length. A great number of skins are annually imported by our furriers. In winter, the whole body of the ermine is of a pure snow white, except the tip of the tail, which is of a deep black; in summer, the upper part of the body is of a pale tawny brown colour. The fur of the ermine is greatly prized; it was formerly one of the insignia of royalty, and is still used by judges, of whose 'unspotted ermine' we speak figuratively. The ermine worn by the queen and the royal family is distinguished from that of the nobility and judges by being thickly set with the black paws of the Astrakhan lamb. That worn by noblemen indicates the rank of the wearer by the number of tail tips with which it is spotted. The ladies of England make extensive use of it without licence from the herald's office. In Russia and Austria the use of ermine is restricted to the imperial families, and in Germany, Spain, and Portugal to the sovereigns. This animal inhabits the northern climates of Europe, Asia, and America, and in its habits strongly resembles the weasel, frequenting barns and outhouses, and feeding not only on mice and rats, but destroying poultry, birds, eggs, &c.——ERMINE, in Heraldry, a fur used in coat armour, and supposed to represent the linings and doublings of mantles and robes.

EROʹTIC POʹETRY (*erōtikos*, amatory; from *erōs*, love: *Gr.*), a term for amatory poetry.

ERPETOLʹOGY. [See HERPETOLOGY.]

ERRAʹTUM (*Lat.*), in the plural *Errata*, an error of the press. A list of *errata* is sometimes printed at the beginning or end of a book.

ERUʹGINOUS (*æruginosus*, from *ærugo*, the rust of brass: *Lat.*), covered with rust. Statues of bronze have always been considered to be improved by *ærugo*, which see.

ERUPʹTION (*eruptio*, a bursting forth: *Lat.*), a violent breaking or bursting forth of anything, particularly of flames and lava from a volcano.——In Medicine, a sudden and copious excretion of humours on the skin in pustules.

ERYSIPʹELAS (*erusipelas*: from *eruthros*, red; and *pella*, the skin: *Gr.*), in Medicine, an inflammatory affection, particularly of the skin, attended with fever. This disease is often called St. Anthony's fire; it is brought on by the various causes that are calculated to excite inflammation, such as injuries of all kinds, the external application of stimulants, exposure to cold, and obstructed perspiration.

ERYTHRIʹNA (*eruthros*, red: *Gr.*), in Botany, a genus of leguminous trees with handsome flowers, commonly called Coral trees.

ESCALAʹDE (*Fr.*), in the Military art, a furious attack made upon a rampart or fortification, by scaling the walls with ladders, the ditches being filled up with bundles of fagots, called fascines, without proceeding in form, breaking ground, or carrying on regular works to secure the men.

ESCAPAʹDE (*Fr.*), unconscious impropriety of speech or behaviour.

ESCAʹPE (*échapper*, to escape: *Fr.*), in Law, the act by which a person arrested gains his liberty before he is delivered by law. In *civil* cases, after the prisoner has been suffered wrongfully to escape, the sheriff is liable for the damage *actually* sustained by the judgment creditors in respect of the escape, and to an attachment besides. In *criminal* cases, the escape of a person arrested is an offence against public justice, and the party aiding is punishable.

ESCAʹPEMENT (*échappement*: *Fr.*), in Horology, a mechanical contrivance for transmitting, in a modified way, the power of a clock or watch, to the regulator, whether the latter is a *balance* or *pendulum*, for the purpose of restoring the motion lost at each vibration by friction, &c.

ESCARʹGATOIRE (*Fr.*, from *escargot*, a shell-snail), a nursery of snails.

ESCARPʹMENT (*Fr.*), in the Military Art, the exterior surface of the revetment.——In Geology, the steep face presented by the sudden termination of strata, so as to form a precipice.

ESʹCHAR (*eschara*: *Gr.*), in Surgery, the crust or scab occasioned by burns or caustic applications.

ESCHAROTʹIC (*escharotikos*, forming an eschar; from same: *Gr.*), in Medicine, a caustic application, or one which has the power of searing or destroying the flesh.

ESCHEATʹ (*eschet*, from *échoir*, to fall due: *Fr.*), in Law, the reversion of land to the original grantor. It occurs when a tenant in fee simple dies without having left any heir to the land. On sentence of death for murder, but not for other felonies, which leave the offender the power of disposing of his estate after death, the land goes to the lord of the fee. There is no escheat of equitable estates.

ESʹCORT (*escorte*: *Fr.*), a guard or company of armed men attending an officer, or baggage, provisions, or munitions, conveyed by land, to protect them from an enemy, &c.

ESCROʹLL (*escrou*, a scroll: *Fr.*), in Heraldry, one of the exterior ornaments of the escutcheon, representing a slip of parchment or paper, on which the motto is generally put.

ESʹCROW (same *deriv.*), in Law, a deed given to a third party, to be the deed of the party making it when a certain condition is fulfilled, until which it has no effect.

ESʹCUAGE or SCUʹTAGE (*scutum*, a shield: *Lat.*), in feudal customs, a pecuniary satisfaction, paid in lieu of military service by tenants in chivalry.

ESCULAʹPIAN (from *Æsculapius*, the physician), pertaining to the healing art.

ESʹCULENT (*esculentus*, from *esca*, food: *Lat.*), an epithet for such plants or roots as may be eaten.

ESCUʹRIAL, a celebrated palace and monastery in Spain, about 22 miles from Madrid, which took its name from the village at which it was erected, and which, in Arabic, signifies the *place of rocks*. It is in the shape of a gridiron, and contains the king's palace, St. Lawrence's church, the monastery of Jeronymites, and the free schools. It was erected by Philip II. in consequence of a vow made by him on the day of the battle of St. Quentin, in 1557, and dedicated to St. Lawrence, whose festival occurred upon that day, and who is said to have suffered martyrdom on a gridiron. Though the building is immensely large, and the most superb in the kingdom, its exterior has rather the austere simplicity of a convent than the elegance of a palace. The principal façade, looking towards the west, is 740 feet long, and 60 feet high to the cornice: it is cut up into five ranges of windows. Towers which are 200 feet high flank the edifice at each angle. The eastern front is 1100 feet long, and the southern 580. The church of the monastery is 364 feet long, 230 feet wide, and 170 feet high. The Escurial occupied 22 years in building.

ESCUTCH'EON (*écusson: Fr.*), in Heraldry, the shield on which a coat of arms is represented. It is an imitation of the shields anciently used in war.

ES'DRAS, the name of two apocryphal books, usually bound up with the Scriptures. They were always excluded from the Jewish canon.

ESOTER'IC (*esōterikos*, from *esō*, within: *Gr.*), an epithet applied to the private instructions and doctrines of Pythagoras; opposed to *exoteric* (*exō*, without: *Gr.*), or public.

ESPA'LIER (*Fr.*), a fruit tree, having the branches trained to a frame, or fastened to stakes, and spread laterally. *Espaliers* are usually planted in rows about a garden so as to enclose separate portions.

ESPAR'TO, a species of grass, the *Lygeum Spartum* of botanists, growing abundantly on the European and African shores of the Mediterranean. It is imported into England for the use of the paper maker. Baskets, mats, ropes, fishing-nets, and brushes, are made of it in the countries where it grows; and in the north of Africa it is the principal food of camels and horses during a journey.

ES'PIONAGE (*espionnage: Fr.*), a system of employing spies, or secret emissaries, either in military or political affairs.

ESPLANA'DE (*Fr.*), in Fortification, the glacis of the counterscarp, or sloping of the parapet of the covered way towards the country. The word is now also used for a sloping walk or promenade.

ESPOU'SALS (*épousailles: Fr.*), in Law, a contract or mutual promise of marriage between a man and woman. A promise to marry hereafter merely gives a right to an action for damages. If the party making it is not twenty-one years of age it is not binding in any way.

ESPRI'T DE CORPS, a French phrase, signifying that species of attachment which persons, and more especially military men, feel towards the service to which they belong.

ES'QUIMAUX, ES'KIMOS, a race of people who live on the shore of a vast extent of country in the extreme north of America, and also in Asia. They appear to be a distinct race from the Red Man, with whom they have very little intercourse. They are strictly a littoral people, never going far inland. They live in villages, and feed on the flesh of reindeer, birds, whales, seals, and fish. In personal courage they are superior to the neighbouring Indians, and they have made a greater advance in civilization. They make light and swift canoes, which they manage with great address, and they have sledges, which are drawn by dogs over the snow in winter. The name by which they are known to Europeans is of uncertain derivation, but some say that it comes from Indian words signifying eaters of raw flesh. Their own name for their nation is Iowit. A belief in witchcraft, and in the agency of evil spirits, prevails amongst them; and they attribute to certain persons amongst them the power of sorcery.

ESQUI'RE (*écuyer: Fr.*), anciently a shield or armour bearer: the person that attended a knight in time of war, and carried his shield. It is now a title given to the sons of knights, or those who serve the king in any important appointment; thus, to officers of the king's courts, barristers-at-law, &c. It has, however, become a sort of vague and undefined compliment, placed at the end of a man's name, and may be regarded more as an expression of respect than anything else.

ES'SAY (*essai: Fr.*), in Literature, a composition intended to prove or illustrate a particular subject, and usually shorter and less methodical than a treatise.

ES'SENCE (*essentia: Lat.*), in Philosophy, that which constitutes the particular nature of a being or substance, and which distinguishes it from all others.——ARTIFICIAL ESSENCES, in Pharmaceutical Chemistry, a number of compounds used in flavouring spirituous liquors or confectionery, and consisting chiefly of ethers and essential oils. The flavours of several fruits are thus successfully imitated.

ESSE'NES or ESSE'NIANS, one of the three ancient Jewish sects; it was more exact than the Pharisees, in attending to the most rigorous observances. The Essenes admitted a future state, but denied a resurrection from the dead. Their way of life was very singular: they did not marry, but adopted the children of others, whom they instructed in the tenets and ritual of their sect; they despised riches, and had all things in common. They are not once mentioned in the New Testament.

ESSEN'TIAL OILS (*essentia*, an essence: *Lat.*), in Chemistry, volatile oils, which have a strong aromatic smell, and are usually drawn from plants by distillation with water. Their taste is acrid and burning, and their odour very pungent; both their taste and smell generally resembling those of the vegetables affording them. The principal volatile or essential oils are those of turpentine, aniseed, nutmeg, lavender, cloves, caraway, peppermint, spearmint, sassafras, camomile, and citron. Perfumers style the essential oils used by them ottos.——ESSENTIAL PROPERTIES, in Logic, such as necessarily depend upon, and are connected with, the nature of a thing; all others are *accidental.*

ESSOIN' (*exoine: Fr.*), in Law, an excuse, by reason of sickness or any other just cause, for one that was summoned to appear and answer an action, &c. It was not neces sary that there should be any ground for this excuse.——The first day of every term was formerly called the *essoin day*, because the court sat on it to take essoins.

ES'SORANT (drying: *Fr.*), in Heraldry, a term for a bird standing on the ground with its wings expanded, as if it had been wet and was drying itself.

ESTAB'LISHMENT (*établissement: Fr.*), in a military sense, the quota of officers and men in an army, regiment, or company, which, being much greater in war than in peace, has given rise to the distinctive terms of *war establishment* and *peace establishment*.——The word is also used when speaking of the ministers of a church established by law; as, belonging to the *establishment*.

ESTACA'DE (*estocade: Fr.*), in the Military art, a dyke constructed with piles in the sea, a river, or morass, to oppose the entry of troops.

ESTAFET'TE (an express: *Fr.*), a military courier sent from one part of an army to another, or a speedy messenger who travels on horseback.

ESTA'TE (*état: Fr.*), in Law, the title or interest that one has in lands, tenements, or other real property. Also the property itself, in which sense estates are either *real*, consisting of lands, tenements, or hereditaments; or *personal*, consisting of goods, money, and all other movables, and of such rights and profits as relate to movables; otherwise distinguished into *freeholds*, which descend to heirs; or *chattels* and effects, which go to executors or administrators.——ESTATES OF THE REALM, the distinct parts of any state or government; as, the king, lords, and commons in England.

EST'HER, a canonical book of the Old Testament, containing the history of a Jewish virgin dwelling with her uncle Mordecai at Shushan, in the reign of Ahasuerus, one of the kings of Persia. Archbishop Usher supposes Darius Hystaspes to be the Ahasuerus of Scripture, and Artystona to be Esther. Scaliger considers him as Xerxes, and his queen Hamestris as Esther. Josephus asserts that Ahasuerus was Artaxerxes Longimanus, and the Septuagint, throughout the whole book of Esther, translates Ahasuerus by Artaxerxes. Some admit the canonicity of Esther only as far as the third verse of the tenth chapter, which, according to the most ancient opinion, is the only portion that is canonical.

ESTIVA'TION. [See ÆSTIVATION.]

ESTOP'PEL (*étouper*, to stop: *Fr.*), in Law, an impediment or bar to the right of action, arising out of a person's own act, or that to which he is privy.

ESTO'VERS, in Law, a reasonable allowance out of lands or goods, for the subsistence of a man accused of felony, during his imprisonment. Also, certain allowances of wood made to tenants, and called, from the Saxon, *house-bote*, *hedge-bote*, *plough-bote*, &c.

ESTRAPA'DE (*Fr.*), the motion of a restive horse, which, to get rid of its rider, rears high, and kicks violently.

ESTRAY', a tame beast found without any known owner, which, if not reclaimed within a year and a day, falls to the lord of the manor.

ESTREAT' OF RECOG'NIZANCE (*extractum*, extracted from: *Lat.*), in Law, a copy of a recognizance which has been forfeited, taken from among the other records, and sent up to the exchequer.

ES'TUARY (*æstuarium*, from *æstus*, the tide: *Lat.*), an arm of the sea; or the broad mouth of a river, &c., where the tide meets the current.

ETCH'ING (*etzen*, to etch; from *eeten*, to eat: *Ger.*), a method of engraving on copper, in which the lines and strokes are eaten in with aquafortis. [See ENGRAVING.]

ETE'SIAN WINDS (*etēsiai*, literally yearly; from *etos*, a year: *Gr.*), a term applied to yearly or regularly periodical winds, answering to the monsoons of the East Indies.——The *Etesian winds* of ancient writers are such as blow at stated times of the year, from whatever part of the compass they may come.

E'THER (*aithēr*, pure air: *Gr.*), SULPHURIC, in Chemistry, a light, volatile, and inflammable liquid, the product of the distillation of equal quantities of alcohol and sulphuric acid. In Chemical Language, it is the oxide of ETHYL, and is composed of one atom of oxygen united to one of that radical. Pure ether is colourless; its specific gravity at 60° is 0·720, and it boils at 96°. It has never been frozen by the severest cold. It burns with a white flame. Fats and oils are dissolved by it.—Physicists, to explain their theories, often invoke the aid of a subtle gas of extreme tenuity, which they term *ether*. In this the motions take place which are supposed to cause the phenomena requiring explanation.

ETH'ICS (*ethikos*, arising from custom; from *ethos*, manners: *Gr.*), the science of morals, or that which treats of the duties of men as intelligent and social beings.

E'THIOPS MIN'ERAL (*aithiops*, sunburnt: *Gr.*), in Chemistry, black sulphuret of mercury. *Ethiops, Martial*, black oxide of iron. *Ethiops per se*, black oxide of mercury.

ETH'MOID (*ēthmos*, a strainer; and *eidos*, form: *Gr.*), in Anatomy, one of the most curious bones in the human body; it is exceedingly light and spongy, and consists of many convoluted plates, which form a network like honeycomb. It is curiously enclosed in the *os frontis*, between the orbitary processes of that bone. One horizontal plate receives the olfactory nerves, which perforate it with such a number of small holes that it resembles a sieve, and hence is named the *cribriform bone*, or *cribrosum os*, which see. Other plates, dropping perpendicularly from this, receive the divided nerves, and give them an opportunity of expanding with the organ of smell. The bones upon which the olfactory nerves are spread out, and which are called the *spongy bones*, are so much convoluted as to greatly extend the surface devoted to this sense. Another flat plate lies in the orbit of the eye; and, being very smooth, that it may not impede the rolling of the eye, it is named the *os planum*, or smooth bone. So that the ethmoid bone supports the fore part of the brain, receives the olfactory nerves, forms the organ of smell, and makes a chief part of the orbit of the eye.

ETH'NICAL (*ethnikos*, belonging to the nations, heathenish: *Gr.*), pertaining to the heathen nations, or those which were not converted to Christianity.

ETHNOL'OGY (*ethnos*, a people; and *logos*, a discourse: *Gr.*), that branch of science which is concerned with ascertaining the relationship of the races of men. For the purpose of arriving at true conclusions, anatomists, who have examined the physical structure of men of different races, linguists, who have studied the languages they speak, and travellers who have recorded their traditions and manners, are consulted.

ETHOL'OGY (*ethos*, custom; and *logos*, a discourse: *Gr.*), a treatise on morality or the science of ethics. Hence, one who writes on the subject of manners and morality is termed an *ethologist*.

ETHYL', in Chemistry, a compound radical, consisting of four atoms of carbon and five of hydrogen, and forming a colourless liquid. It is the base of alcohol and a great number of ethers Thus, the oxide of ethyl is ether; the hydrate of the oxide, alcohol; the nitrate of the oxide, nitrous ether (the basis of the sweet spirits of nitre of the shops), &c.

ETIOLA'TION, the operation of being whitened, by excluding the light of the sun: a term used by botanists and gardeners. The stalks of the leaves of celery are designedly etiolated.

ETIOL'OGY (*aitiologia:* from *aitia*, a cause; and *logos*, a discourse: *Gr.*), an account of the causes of anything, particularly of diseases

ETIQUETTE (*Fr*), the rules and ceremonies which good manners require to be observed towards particular persons.

EU'CHARIST (*eucharistia*, gratitude *Gr*), the sacrament of the Lord's Supper, so called because Christ's death is thereby commemorated with thankful recollection, and bread and wine are taken 'in remembrance of him.' The Roman Catholics maintain that the bread and wine *cease to exist* in the Eucharist, the body and blood of Christ taking their place The Lutherans believe that Christ's body and blood are present *along with* the bread and wine [See TRANSUBSTANTIATION and CONSUBSTANTIATION.]

EUCHLO'RINE (*eu*, very; and *chlōros*, green: *Gr.*), in Chemistry, oxide of chlorine

EUCHOL'OGY (*euchologion:* from *euchē*, prayer; and *lego*, I collect: *Gr.*), the ritual of the Greek church, in which are set down the order of ceremonies, sacraments, and ordinances.

EUCHY'MIA or EU'CHYMY (*eu*, well; and *chumos*, juice: *Gr.*), in Medicine, a good state of the blood and other fluids of the body.

EUCHYSID'ERITE (*eu*, easily; and *chusis*, a melting: *Gr*), in Mineralogy, a species of *Pyroxene*, consisting of silicate of lime, magnesia, and protoxide of iron.

EU'CLASE (*eu*, easily; and *klasis*, a breaking: *Gr.*), a species of emerald, of a greenish colour. It is a rare mineral, consisting of silicate of glucina and alumina.

EU'CRASY (*eukrasia:* from *eu*, right; and *krasis*, a mixing: *Gr.*), in Medicine, such a well-proportioned combination of qualities in bodies as to constitute sound health

EUDI'ALYTE (*eu*, easily; and *dialutos*, dissolved: *Gr.*, from the facility with which it is gelatinized by hydrochloric acid), a mineral from Greenland, of a red colour, containing silica, zirconia, lime, and soda, with the oxides of iron and manganese.

EUDIOM'ETER (*eudia*, calm air; and *metron*, a measure: *Gr.*), an instrument for ascertaining the purity of air—erroneously supposed to be dependent on the quantity of oxygen present, which, however, is found to be invariable. The best kind of eudiometer is a glass tube, in which a mixture of atmospheric air and hydrogen is exploded: one-third of the gas, which, being formed into water, disappears, is oxygen, and the proportion which it bears to the quantity of atmospheric air employed, is known.

EUHARMON'IC (*eu*, correctly; and *harmonikos*, harmonic: *Gr.*), in Music, producing harmony or concordant sounds.

EUK'AIRITE (*eukairos*, rich: *Gr.*), a native seleniuret of silver and copper, from Sweden.

EU'LOGY (*eulogia:* from *eu*, well; and *logos*, a discourse: *Gr.*), a speech or writing in commendation of a person.

EU'PEPSY (*eupepsia*. from *eu*, right; and *pepsis*, digestion: *Gr.*), in Medicine, a good action of the stomach; perfect digestion.

EU'PHEMISM (*euphēmismos:* from *eu*, agreeable; and *phēmē*, a speech: *Gr.*), in Rhetoric, a figure by which things in themselves disagreeable or offensive, are expressed in terms neither offensive to good manners nor repulsive to 'ears polite.'

EU'PHONY (*euphonia:* from *eu*, agreeable; and *phōnē*, a sound: *Gr.*), an easy and smooth enunciation of words. A grammatical licence, by which a letter that is too harsh is converted into a smoother, contrary to the ordinary rules, for the purpose of promoting smoothness and elegance in the pronunciation.

EUPHOR'BIACEÆ, an extensive order of plants, of which many abound with a poisonous juice that is usually milky. The flowers are unisexual. The secretions of some are used in medicine, and a nutritious starch is obtained from others. To this order belong the common box, the croton oil tree, the physic nut tree (*Jatropha purgans*), the manihot, from the root of which CASSAVA and TAPIOCA are obtained, the CASTOR OIL plant, *Siphonia elastica*, yielding India rubber, and *Stillingia sebifera*, the TALLOW-TREE Some species are highly ornamental plants, cultivated in hot-houses, whilst others curiously resemble cactuses, and some are common weeds. In England there are several wild herbaceous species belonging to the genus *Euphorbia*, so named by Linnæus after Euphorbus, physician to king Juba of Mauritania.

EUPHOR'BIUM, in Medicine, a concrete

gum-resin, the produce of the *Euphorbia officinalis*. When first chewed it has little taste, but it soon gives a very acrid burning sensation to the tongue, palate, and throat, which is very permanent, and almost insupportable. Its very dust is a dangerous stimulant to the nose.

EU'RITE (*eurus*, broad: *Gr.*), in Geology, very small-grained granite, with the parts so intimately blended as often to appear compact. The name is also applied to a rock, in which common felspar predominates, without any mica. It is thin, of a white colour, and may be called a felspathic granite.

EU'RYTHMY (*euruthmia*: from *eu*, right; and *ruthmos*, proportion: *Gr.*), in Architecture, Painting, and Sculpture, a certain majesty, elegance, and ease in the various parts of a body, arising from its just proportions.——In Medicine, a good action of the pulse.

EUSTA'CHIAN TUBE (named after the celebrated anatomist *Eustachius*), in Anatomy, the communication between the ear and mouth. Persons who have a perforated tympanum can blow tobacco-smoke through it; deafness results if it is stopped. Though its discovery has been attributed to Eustachius, Aristotle, who accurately describes it, quotes an earlier Greek anatomist as having known it.

EUSTA'THIANS, the followers of Eustathius, who, in the 4th century, under pretence of great purity and severity, introduced many extravagant notions. His teaching was condemned by the council of Gangra, held soon after the council of Nice.

EU'STYLE (*eustulos*: from *eu*, correct; and *stulos*, a column: *Gr.*), in Architecture, a style of building in which the columns are placed at the most convenient distances from each other, most of the intercolumniations being generally two and a quarter diameters of the column.

EUTY'CHIANS, a religious sect in the 5th century, called after Eutyches, abbot of a monastery at Constantinople, who maintained, among other things, that the human nature of Christ was absorbed by the divine, so that there was only one nature in him, and that the divine. This was in opposition to the Nestorians, who asserted the distinctness of the two natures of Christ so far, that they considered the human nature as the mere dwelling-place of the divine. The Eutychian doctrine was the occasion of a long and violent controversy, and led to a civil war. It was first condemned, and Eutyches excommunicated, by an occasional council. Eutyches was then acquitted by the general council of Ephesus A.D. 449. By the council of Chalcedon, 451, he was again condemned.

EVAN'GELIST (*euangelistēs*, a bringer of good tidings: *Gr.*), a general name given to those who write or preach the gospel of Jesus Christ. But it is specially applied to the writers of the four Gospels, viz. Matthew, Mark, Luke, and John.——The word also denotes certain ministers in the primitive church, who assisted the apostles in diffusing the knowledge of the gospel, and travelled about to execute such commissions as they were intrusted with, for the advancement of Christianity.

EVAPORA'TION (*evaporatio*: *Lat.*), in Natural Philosophy, that conversion of substances into vapour, which is caused by heat. The vapour which rises from water, in consequence of becoming lighter than the atmosphere, ascends considerably above the surface of the earth, and afterwards, by condensation, forms clouds. When water is heated to 212°, it is rapidly converted into steam; and if the heat is applied below, it *boils*. The same change takes place at much lower temperatures; but in that case the evaporation is slower, and the elasticity of the vapour is less. The vapour, and the fluid from which it rises, are always of the same temperature; the caloric which disappears being required on account of the greater capacity which the vapour has for caloric: steam at 212° contains 1000° more heat than water at the same temperature. As a very considerable proportion of the earth's surface is covered with water, and as this water is constantly evaporating and mixing with the atmosphere in the state of vapour, a precise determination of the rate of evaporation must be of very great importance in meteorology.

EVEC'TICA or **EVEC'TICS** (*euektikos*, conducive to sound health: from *eu*, well; and *echo*, I keep myself: *Gr.*), that part of medicine which teaches how to acquire a good habit of body.

EVEC'TION (*eveho*, I raise up: *Lat.*), *of the moon*, in Astronomy, one of her most considerable irregularities, caused by the action of the sun upon her; the general effect of which is to diminish the equation of the centre at the syzygies, and to increase it in the quadratures. When the transverse axis of the lunar orbit lies in the same direction with the line of the syzygies, or that joining the sun and earth, the quantity by which the solar force diminishes the gravitation of the moon is greatest if the moon is in apogee, and least if in perigee. The difference between the moon's gravitation at her apogee and perigee is therefore increased by the solar action, and consequently her orbit seems to have its excentricity augmented. When the line of the apsides is in the quadratures, the contrary happens: the difference of her gravitation is diminished, and the excentricity of her orbit seems also diminished. The result is, that the moon is alternately in advance and in arrear of her elliptic place by about 1¼°.

E'VENING or **EVE** (*efen*: *Sax.*). In strictness, evening commences at the setting of the sun, and continues during twilight; and *night* commences with total darkness. But it sometimes includes a portion of the afternoon; and in customary language it extends to bed-time.——**EVENING STAR**, in Astronomy, Hesperus or Vesper; *Venus*, when visible in the evening.

EV'IDENCE (*evidentia*: *Lat.*), in its most general sense, means the proofs which establish, or have a tendency to establish, any facts or conclusions. It may be divided into three sorts, mathematical, moral, and legal. The first is employed in the demonstrations which belong to pure mathematics; the second, in the general affairs of life, and in those reasonings which are applied to convince the understanding in cases not admitting of strict demonstration; the third is that which is adduced before judicial tribunals, for the purpose of obtaining decisions upon the rights and wrongs of litigants. According to our system of jurisprudence in common-law trials, it is the peculiar province of a jury to decide all matters of fact. The verdict of the jury is, however, to be given, and the trial is to take place, in the presence of a judge or judges who preside, and are bound to decide all matters of law which suggest themselves in the course of the trial. Whenever, therefore, a question arises, whether anything offered as proof at such trial is or is not proper to go before the jury as evidence, that question is to be decided by the court, and, unless permitted by the court, it can never legally come before the consideration of the jury. Hence, whatever is so permitted to be brought before the jury, for the purpose of enabling them to decide any matter of fact in dispute between the parties, is, in a legal sense, *evidence*, and is so called in contradistinction from mere argument and comment. This gives rise to a very important distinction, at common law, as to the *competency* and the *credibility* of evidence. It is *competent*, when, by the principles of law, it is admissible to establish any fact, or has any tendency to prove it. It is *credible*, when, being introduced, it affords satisfactory proof of the fact. It follows, therefore, that evidence may be *competent* to be produced before a jury, when it may nevertheless not amount to *credible* proof so as to satisfy the minds of the jury; and, on the other hand, it may be such that, if before them, it would satisfy their minds of the truth of the fact, but yet, by the rules of law, it is not admissible. Whether there is *any evidence* of a fact is a question for the court; whether it is *sufficient* is a question for the jury.

EVOCA'TI (*Lat.*, from *evoco*, I call out), soldiers among the Romans, who, having served their full time in the army, went afterwards as volunteers at the request of some favourite general; on which account they were called by the honourable names of *Emeriti* and *Beneficiarii*.

EV'OLUTE (*evolutus*, unrolled: *Lat.*), in Geometry, an original curve from which another is described.

EVOLU'TION (*evolutio*, an unrolling: *Lat.*), in Algebra, the extraction of roots from powers; the reverse of *involution*.——In Geometry, the unfolding or opening a curve, and making it describe an evolvent.——In Military tactics, the complicated movement of a body of men when they change their position by counter-marching, wheeling, &c.

EVOL'VENT (*evolvo*, I unroll: *Lat.*), in Geometry, the curve described from the evolute.

EW'RY (*eyer*, a ewer: *Norm. Fr.*; from *eye*, water: *Sax.*), a department in the royal household, which had charge of the table-linen, &c., in former times.

EXACERBA'TION (*exacerbo*, I aggravate: *Lat.*), in Medicine, the increased violence of a disease. The term is generally restricted to the periodical increase of remittent and continued fevers, where there is no absolute cessation of the fever.

EXÆ'RESIS (*exairesis*, a taking out: *Gr.*), in Surgery, the operation of extracting or taking away something that is hurtful to the human body.

EXAGGERA'TION (*exaggeratio*, literally a heaping up: *Lat.*), in Rhetoric, a kind of hyperbole, in which things are augmented or amplified by saying more than the strict truth would warrant.——In Painting, the representation of things in a manner stronger than the reality.

EXALTA'TION (*exaltatio*, a raising up: *Lat.*), in Astrology, the dignity which a planet acquires in certain signs or parts of the zodiac, and which is supposed to give it an extraordinary efficacy and influence.

EXAMINA'TION (*examinatio*: *Lat.*), in judicial proceedings, an attempt to ascertain the truth, generally on the oath of the party examined.

EXAM'INERS (*examinator*: *Lat*), in Law, officers in the Court of Chancery, who are appointed to examine witnesses on either side. The evidence taken by them follows the same rules as that given in a court of common law.

EXAN'THEMA, or **EXANTHE'MATA** (*exanthēma*, a flower, and hence an eruption: *Gr.*), among physicians, any kind of efflorescence or eruption; as in measles, small-pox, scarlatina, &c. The term is now limited by systematic nosologists to such eruptions as are accompanied with fever. ——The adjective is *exanthematous*.

EXANTHRO'PIA (*exanthrōpos*, degraded: *ex*, away from; and *anthrōpos*, a man: *Gr.*), in Medicine, a species of melancholy madness, in which the patient fancies himself a brute.

EX'ARCH (*exarchos*: *Gr.*), in Antiquity, an officer sent by the emperors of the East into Italy as prefect or governor.——Exarch also denotes an officer still found in the Greek church, who visits the provinces in order to see whether the bishops and clergy do their duty.

EXARTICULA'TION (*ex*, out of; and *articulus*, a joint: *Lat.*), in Surgery, the dislocation of a joint.

EXCALCEA'TION (*excalceo*, I take off the shoes: *Lat.*). Among the Jews, a widow, whom her husband's brother refused to marry, had a right to summon him to a court of justice, and, upon his persevering, to pull off one of his shoes and spit in his face, both which actions were considered very ignominious.

EX'CELLENCY (*excellence*: *Fr.*), a title of honour, formerly confined to kings and emperors, but now given to governors, ambassadors, and diplomatic ministers. The title of excellency is in no case hereditary or transferable, but exclusively belongs to the office; and it is borne, on the European continent, only by ministers in actual service, by the highest court and military dignitaries, and by ambassadors and plenipotentiaries. Foreign ministers are addressed as *your excellency*, by way of courtesy, even if they have no rank which entitles them to this distinction; but *chargés d'affaires* never receive this title. The lord-lieutenant of Ireland, and the governors of British colonies, are styled *excellency*.

EXCEP'TION (*exceptio: Lat.*), in Law, the denial of the matter alleged in bar of action. In Chancery, what is alleged against the sufficiency of the answer.——**BILL OF EXCEPTIONS**, a statement of exceptions to the direction or decision of a judge at a trial, on account of his misstating the law, &c., tendered to him by one of the parties, and which the judge must sign or seal.

EXCESS' (*excès: Fr.*), in Arithmetic and Geometry, the difference between any two unequal numbers or quantities; or that which is left after the less is taken from or out of the greater.——In Trigonometry, the difference between the sums of the three angles of a spherical triangle and two right angles.

EXCHAN'GE (*Fr.*), in Commerce, traffic by permutation, or the act of giving one thing or commodity for another. Also, the receipt or payment of money in one country for the like sum in another, by means of *bills of exchange*. Thus, *A* in London is creditor to *B* in Paris to the amount of 100*l.*; *C* in London is debtor to *D* in Paris in a like sum. By the operation of the bill of exchange, the London creditor is paid by the London debtor, and the Paris creditor is paid by the Paris debtor, and consequently two debts are paid, though no specie is sent from London to Paris, or from Paris to London. This is the principle of a bill of exchange; and its great convenience is the foundation of exchange itself. That variation *above* and *below par*, which is called the course of exchange, results from the same causes that act upon the price of commodities of every other kind. If bills upon Paris be scarce, that is, if Paris is but little indebted to London, the London creditor, who wants bills on Paris to remit to that city, is obliged to purchase them dearly, then the course of exchange is *above par*. If, on the other hand, London owes less to Paris than Paris owes to London, Paris bills will be proportionably plenty, and the exchange with that city *below par*. Hence, it is a maxim that, when the course of exchange rises *above par*, the balance of trade runs against the country where it rises.——In London, bills of exchange are bought and sold by brokers, who go round to the principal merchants and discover whether they are buyers or sellers of bills. A few of the brokers of most influence, after ascertaining the relative supply of and demand for bills, suggest a price at which the greater part of the transactions of the day are settled, with such deviations as particular bills, from their being in very high or low credit, may be subject to. In London and other great commercial cities, a class of middlemen speculate largely on the rise and fall of the exchange, buying bills when they expect a rise, and selling them when a fall is anticipated.——*Exchange* (often contracted into *Change*, and termed in France the *Bourse*), a building or other place in considerable trading cities, where the merchants, agents, bankers, brokers, and other persons concerned in commerce, meet at certain times to confer and treat together on matters relating to exchanges, remittances, payments, adventures, assurances, freights, and other mercantile negociations both by sea and by land. ——*Course of exchange*, the rate at which bills of exchange may be obtained. It is affected by variations which may be either real or nominal. They are *real* when they grow out of circumstances affecting trade; *nominal*, when they arise from any discrepancy in the actual weight or fineness of the coin (which in scarcely any foreign country corresponds to our Mint standard), from the use of paper money, &c. A fall of the *nominal* exchange has no effect on trade; but an unfavourable *real* exchange has, since it increases exportation and decreases importation. The true *par* forms the centre of the oscillations arising from the favourable and unfavourable states of the real exchange. ——*Arbitration of exchanges*, the mode of estimating the value of the money of any one place, not drawn directly, but through one or more other places.——**EXCHANGE OF PRISONERS**, in War, the act of giving up men on both sides, upon certain conditions agreed to by the contending parties.——**EXCHANGE**, in Arithmetic, the finding what quantity of the money in one place is equal to a given sum in another, according to a certain course of exchange.

EXCHEQ'UER (*échiquier: Fr.*), in British Jurisprudence, an ancient court of record, in which all causes concerning the revenues and rights of the crown were heard and determined, and where the crown revenues were received. It took its name from the cloth that covered the table, which was parti-coloured or chequered. This court is said to have been established by William the Conqueror. In its modern form, it is a combination of several distinct ancient courts. It acquired concurrent jurisdiction with the other two superior courts, in all personal actions, by the fiction of the complaining party being debtor to the king—a fiction now obsolete. It has exclusive jurisdiction in cases in which the king's revenue is concerned. It had also an equitable jurisdiction, exclusive with respect to matters connected with the revenue, concurrent with the Court of Chancery in civil suits and in tithes, but all its power and jurisdiction as a court of equity has been transferred to the Court of Chancery, and it is now only a court of revenue and of common law. Its chief, and four Puisne or younger judges, are termed barons.

EXCHEQ'UER-BILLS, bills for money, or promissory notes, issued from the exchequer under the authority of government, and bearing interest, generally from 1½*d.* to 2*d* per day, per 100*l.* Advances made by the bank to government are made on exchequer bills.

EXCI'SE (*Fr.*), an inland duty, paid in some instances upon the commodity consumed, or on the retail, which is the last stage before consumption; but paid in others at the manufactories. The excise was first introduced by the parliament which beheaded Charles I., its founder being Pym; and it is now one of the most considerable branches of the national revenue. It was formerly farmed out, but is at present managed for the government by commissioners, who receive the whole produce of the excise and pay it into the exchequer.

EXCIS'ION (*excisio: Lat.*), in Surgery, a cutting out or cutting off any part of the body.

EXCITABIL'ITY (*excito*, I stimulate: *Lat.*), susceptibility of increased vital action by the force of stimulants.

EXCLAMA'TION (*exclamatio: Lat.*), emphatical utterance, or the sign by which emphatical utterance is marked: thus (!). ——In Grammar, a word expressing wonder, fear, &c.

EXCOMMUNICA'TION (*excommunicatio: Lat.*), an ecclesiastical censure, by which a person is excluded from communion with the church, and deprived of some civil rights. In the Church of England, the practice of excommunication has long been obsolete. Roman Catholics say that an excommunication is *fulminated* (*fulmen*, lightning: *Lat.*), to signify the solemn pronouncing of it after several admonitions, and to indicate what they believe to be its awful character. This fulmination principally consists in curses and execrations. ——EXCOMMUNICATION, amongst the Jews, was of three kinds or degrees. The first was called *Niddui*, and was a separation for a few days. The second was *Cherem*, a separation attended with execration and malediction; the third was *Shammatha*, and was the last and most solemn.——EXCOMMUNICATION, amongst the Greeks and Romans, excluded the person on whom it was pronounced from the sacrifices and temples, and delivered him over to the *Furies*

EXCRES'CENCE (*excresco*, I grow out of: *Lat.*), in Surgery, a tumour which arises upon the skin, either in the form of a wart or tubercle.

EXCRE'TION (*excretus*, sifted out: *Lat.*), in Medicine, a separation of some fluid mixed with the blood, by means of the glands. The term is applied also to the discharges from the bowels, which are called *alvine excretions*.

EX'EAT (let him go out: *Lat.*), in Ecclesiastical History, a term expressing the permission which a bishop grants to a priest to go out of his diocese, for the purpose of receiving an ecclesiastical appointment in another.

EXECU'TION (*executio: Lat.*), in Law, the completing or finishing some act, as the signing, sealing, and delivering a written deed. Also, the carrying into effect a sentence or judgment of court.

EXEC'UTIVE (*exequor*, I accomplish, literally I follow to the end: *Lat.*), in Politics, that branch of the government which executes the functions of governing the state. The word is used in distinction from *legislative* and *judicial*. The body that deliberates and enacts laws is *legislative*; the body that judges or applies the laws to particular cases is *judicial*; and the body that carries the laws into effect, or superintends their enforcement, is *executive*. In all monarchical states the executive power vests in the prince.

EXEC'UTOR (from same), in Law, a person appointed by any one in his last will and testament to have the execution of it after his decease, and the disposing of his goods and effects according to the intent of the will.

EXEC'UTORY (from same), in Law, signifies that which is to take effect on a future contingency; as an *executory* devise or remainder.

EX'EDRA or EXHE'DRA (*Gr.*: from *ek*, provided with; and *hedra*, a chair), in Antiquity, a covered walk or space in front of a house; also, a hall, in baths and other buildings, appropriated to conversation.——A general name for such buildings as were distinct from the main body of the churches, and yet within the limits of the consecrated ground.

EXEGE'SIS (*exēgēsis*, an explanation: *Gr.*), a discourse intended to explain or illustrate a subject, particularly the sacred Scriptures

EXEM'PLAR (*Lat.*), a pattern or model: the ideal model which an artist endeavours to imitate.

EXEQUA'TUR (let it be carried out: *Lat.*), an official recognition of a person as consul or commercial agent, authorizing him to exercise his powers.

EXER'GUE (*Fr.*), a term used by medallists to denote the small space around, and without, the work or figures of a medal, for an inscription, &c.

EXHAUS'TION (*exhaustus*, emptied: *Lat.*), in Mathematics, a method of proving the equality of two magnitudes, by showing that their difference is less than any assignable magnitude. As the ancients admitted no demonstrations which were not strictly rigorous, they did not consider curves as polygons with an infinite number of sides; but they regarded them as the fixed terms or limits to which the inscribed and circumscribed polygons continually approach, and approach the nearer as the number of their sides is increased. They exhausted, as it were, the space between the polygons and the curves.—— In Pneumatics, the amount of rarefaction produced by the air-pump.

EXHEREDA'TION (*exhæredatio: Lat.*), in the Civil Law, the excluding a child from inheriting any part of his father's estate.

EXHIB'IT (*exhibitum*, something shown: *Lat.*), any paper produced or presented to a court, or to auditors, referees, or arbitrators, as a voucher, &c.——In Chancery, a deed or writing produced in court and sworn to, or referred to in an affidavit sworn out of court. A certificate of identity is indorsed on it by the examiner or commissioner.

EXHIBI'TION (*exhibitio: Lat.*), a public display of whatever is interesting, either in nature or art. Also, a fund settled for the benefit of scholars in the universities, who are not on the foundation. The person receiving this is called an *exhibitioner*.——

EXHIBITION was anciently an allowance for meat and drink, such as the religious appropriators made to the poor depending vicar.——Medical men speak of the exhibition, that is, the administering of such or such a medicine.

EX'IGENT (they shall demand: *Lat.*), in Law, a writ or part of the process of outlawry. The *exigent* or *exigi facias* requires the defendant to be summoned by proclamation, in five county courts successively, to deliver himself up; and if he does not, he is outlawed.

EX'ILE (*exilium: Lat.*), a state of banishment or expulsion from one's country by authority.

EXIS'TENCE (*existo*, I am: *Lat.*), the state of being, or having an actual essence. Locke says that we arrive at the knowledge of our own existence by intuition; of the existence of God, by demonstration; and of other things, by sensation.

EX'IT (he goes away: *Lat.*), a departure; a term used to denote the action of quitting the stage by a player after he has performed his part.

EXOCŒ'TUS (*Lat.*), in Ichthyology, a genus of flying-fishes. The *Exocœtus exiliens*, or the Mediterranean flying fish, is about fourteen inches in length, and found principally in the Mediterranean and the Atlantic, frequently alone, and sometimes in small shoals. By the extraordinary length of its pectoral fins it is enabled to quit the water and continue flying, about three feet above the surface, for the distance of 80 or 100 yards. These fishes are persecuted by the dolphin under the water, and by the gull or the albatross above its surface, and thus often escape destruction by the one only to incur it from the other.

EX'ODUS (*exodos*, a going out: *Gr.*), a canonical book of the Old Testament, being the second of the Pentateuch or five books of Moses. It contains a history of the departure of the children of Israel from Egypt, whence the name.

EX-OFFI'CIO (on account of his office: *Lat.*), in Law, the power a person has, by virtue of his office, to do certain acts without special authority.——EX-OFFICIO INFORMATIONS are prosecutions commenced on behalf of the Crown by one of the law officers.

EXO'GENOUS (*exō*, on the outside; and *ginomai*, I am produced: *Gr.*), a Botanical term applied to plants which increase by successive external additions of their wood in contradistinction from *endogenous*. All dicotyledonous plants are exogenous. The stems of exogenous trees, for example, the oak, beech, and elm, have distinct cellular and vascular systems. To the former belong the outer bark, the pith, and the medullary rays; to the latter, the inner bark, the woody layers and the medullary sheath.

EXOM'PHALOS (*ex*, away from; and *omphalos*, the navel: *Gr.*), in Surgery, a rupture of the navel.

EX'ORCISM (*exorkismos: Gr.*), the expulsion of evil spirits from persons or places, by certain adjurations and ceremonies. Exorcism makes a considerable part of the ritual of the church of Rome, which prohibits the exorcising any person except with the bishop's leave, or through the ministration of one who has been ordained *exorcist*.

EX'ORCIST (*exorkistēs: Gr.*), one who professes to cast out evil spirits by prayers or incantations.——A person who has received one of the four *minor orders* of the church of Rome.

EXOR'DIUM (a beginning: *Lat.*), in Rhetoric, the commencement of a speech, serving to prepare the audience for the main subject. It may be formal and deliberate, or abrupt and vehement, according to the nature of the subject and the occasion.

EX'OSMOSE (*ex*, out of; *mõ*, I seek: *Gr.*), a term denoting the passage outward from within, of fluids, through membranes, in opposition to *endosmose* (*endon*, within: *Gr.*). When fluids of different densities are placed on opposite sides of a membrane, whether animal or vegetable, a certain portion of each will pass through in opposite directions. This process is of universal occurrence in living plants.

EXOS'TOSIS (*ex*, away from; and *osteon*, a bone: *Gr.*), in Surgery, a morbid excrescence on a bone, whether attended with an erosion or not.

EXOS'TRA (*exōstra: Gr.*), in Antiquity, a bridge thrust out of a turret on the walls of a town, by which the besiegers gained an entrance into it.——Also, in the ancient drama, a machine for representing the interior of a building, where the parts supposed to occur in privacy were recited.

EXOT'ERIC. [See ESOTERIC.]

EXOT'IC (*exōtikos: Gr.*), an appellation for the produce of foreign countries.

EXPAN'SION (*expansio: Lat.*), in Natural Philosophy, enlargement or increase of bulk. It is one of the most general effects of heat which produces it in all bodies, whether solid or fluid, or in an aeriform state. Some bodies expand as they grow cold, thus water in the act of freezing; but they form no exceptions to the general rule: since the effect is due to a peculiar arrangement of their particles during crystallization, and is not a regular and gradual expansion, like that which occurs by means of heat. Several of the metals expand, in passing from a fluid to a solid state. The degree of expansion produced by heat, in different liquids, varies very considerably. In general, the denser the fluid, the less the expansion: water expands more than mercury; and alcohol, which is lighter than water, expands more than water. The expansion of aeriform fluids may be exhibited by bringing a bladder, partly filled with air, and the neck closely tied, near the fire: the bladder will soon be distended, and, if the heat be strong enough, will burst.

EX-PAR'TE (from a part: *Lat.*), in Law, on one side; as *ex-parte* statement, a partial statement, or that which is made by one side only.

EXPEC'TANCY (*expecto*, I look for: *Lat.*), in Law, a state of waiting or suspense. An *estate in expectancy* is one which is to take effect or commence after the determination of another estate. Estates of this kind are *remainders* and *reversions*.

EXPECTA'TION (*expectatio: Lat.*), in the doctrine of chances, is applied to any contingent event, upon the happening of which some benefit is expected.——EXPECTATION OF LIFE, a term referring to the number of years which, according to the data afforded by statistical tables, persons at any age may be expected to live.

EXPEC'TORANTS (*expectoro*, I expectorate: *Lat.*), those medicines which promote expectoration, or a discharge of mucus from the trachea and respiratory organs.

EXPER'IMENT (*experimentum: Lat.*), an act or operation designed to discover some unknown truth, principle, or effect.——In Chemistry, a trial of the results of certain combinations of bodies, in order to discover something of their laws.

EXPERIMEN'TAL PHILOS'OPHY (same *deriv.*), those branches of science, the deductions in which are founded on experiment, as contrasted with the moral, mathematical, and speculative departments of knowledge. The principal experimental science is Chemistry; but there are many others, as Optics, Pneumatics, Hydrostatics, Electricity, Magnetism, &c.

EXPERIMEN'TUM CRU'CIS (the experiment of the cross: *Lat.*). [See CRUCIAL.]

EXPIA'TION (*expiatio*, an atonement: *Lat.*), a religious ceremony, by which satisfaction is made for sins of omission or commission, accidental or intentional. The chief mode of expiation among the Jews and pagans was by sacrifice.——EXPIATION is applied by divines to the pardon procured for sin by the obedience and death of Christ.

EXPIRA'TION (*expiratio: Lat.*), in Animal Physiology, that part of respiration which consists in expelling the air out of the lungs.

EXPLO'SION (*explosio: Lat.*), in Natural Philosophy, a sudden and violent expansion of an aerial or other elastic fluid, by which it instantly overcomes any obstacle that happens to be in the way, sometimes with incredible force, and in such a manner as to produce the most astonishing effects. For example, gunpowder explodes on the application of heat, by the sudden conversion of a solid into gases. It differs from mere expansion, by being sudden and violent, while the latter acts gradually and uniformly for some time.

EXPO'NENT (*expono*, I exhibit: *Lat.*), in Algebra, the literal or numerical quantity which, placed above a root at the right hand, denotes how many multiplications are necessary to produce the power. It is a mere abbreviation:—thus, a^4 is a short way of expressing $a \times a \times a \times a$, or *aaaa*.

EXPONEN'TIAL (same *deriv.*), that which relates to exponents. Thus, an *exponential curve* is a curve defined by an exponential equation, such as [illegible]

EXPOS'ITOR (*Lat.*), one who explains the writings of others; the term is applied particularly to those who profess to expound the Scriptures.

EX POST FAC'TO (from something done afterwards: *Lat.*). An *ex post facto* law is one which operates upon a su liable to it at the time it was ma

EXPOSTULA'TION (*expostula* in Rhetoric, a warm address to who has done another some inju senting the wrong in the strong and demanding reparation.

EXPRESS' (*exprès: Fr.*), a me courier sent to communicate in of an important event, or to d portant despatches.

EXPRESS'ED OILS (*exprimo*, out: *Lat.*), in Chemistry, such procured from any substance pressure, as the oil of almonds, &

EXPRES'SION (*expressio: Lat.*) ing, the distinct and natural exh character or of sentiment in the i represented. The term expressi quently confounded with pass they differ in this: that *expres* general term, implying a represe an object agreeably to its natur racter, and the use or office it is t the work; whereas *passion*, in denotes a motion of the body, acc with certain indications of stro portrayed in the countenance; so that every passion is an expression, but not every expression a passion.——EXPRESSION, in Rhetoric, the elocution, diction, or choice of words, suited to the subject and sentiment.——In Music, the tone and manner which give life and reality to ideas and sentiments.

EXPROPRIA'TION (*ex*, from; and *proprius*, one's own: *Lat.*), the surrender of a claim to exclusive property.

EXPUI'TION (*expuitio*, a spitting out: *Lat.*), in Medicine, a discharge of saliva by spitting.

EXPUR'GATORY (*expurgatio*, a cleansing: *Lat.*), serving to purify from anything considered noxious or erroneous; as, the *expurgatory* index of the Roman Catholics. This is a catalogue of the books prohibited to be read; it is very comprehensive, and includes all works on religious subjects written by heretics, all works written on any subjects by heresiarchs, and many works seemingly having but little connection with religious matters. It is particularly strict in the prohibition of the *Bible* in *vernacular* tongues. The reader of books placed on this *Index* incurs serious ecclesiastical penalties and censures by the *very fact*. It is published annually at Rome.

EXSAN'GUIOUS (*exsanguis*, bloodless: *Lat.*), an epithet for animals which are destitute of red blood.

EXSICCA'TION (*exsicco*, I dry up: *Lat.*), the act of drying, or the evaporation of moisture.

EXSTIP'ULATE (*ex*, from; and *stipula*, a husk: *Lat.*), in Botany, an epithet for plants which have no stipules.

EXSUDA'TION (*exsudo*, I perspire: *Lat.*), in Medicine, a discharge of humours or moisture from animal bodies, by sweat or through the pores.

EX'TANT (*extans*, existing: *Lat.*), an epithet for anything which still subsists or is in being; thus we say, a part only of the writings of Cicero is *extant*.

EXTEM'PORE (on the emergency: *Lat.*), without previous study or meditation. Though an adverb, it is often unnecessarily and improperly used as an adjective; as, an *extempore* sermon, instead of an *extemporary* or *extemporaneous* sermon, &c.——To *extemporize* well requires a ready mind well furnished with knowledge.

EXTEN'SION (*extensio*, a stretching out: *Lat.*), in Philosophy, one of the common and essential properties of matter, or that by which it occupies some part of universal space.

EXTEN'SOR (*extendo*, I stretch out: *Lat.*), in Anatomy, an appellation given to several muscles, from their extending or stretching the parts to which they belong.

EXTENT', in Law, a writ of execution, sometimes called an *extendi facias* (you shall cause to be appraised at their full or extended value), directed to the sheriff, against the body, lands, and goods, or the lands only of a debtor. It is either extent *in chief*, or extent *in aid*. The former is a proceeding for the king to recover his own debt; the latter, a proceeding for recovering the debt due to a crown debtor, and in this the crown is the nominal plaintiff, on the ground that it is entitled to the debts due to the debtor.

EXTENUA'TION (*extenuatio*, a diminishing: *Lat.*), the act of representing anything less faulty or criminal than it is in fact; it is opposed to *aggravation*.

EXTIN'GUISHMENT (*extinguo*, I quench: *Lat.*), in Law, the annihilation of an estate, &c., by means of its being merged in or consolidated with another. Thus, a term of years is extinguished when the lessee acquires the legal reversion.

EX'TRA, a Latin preposition, denoting beyond or excess: as, *extra-work*, *extra-pay*, &c. It serves as a prefix to numerous English words.

EX'TRACT (*extractus*, drawn out: *Lat.*), in Pharmaceutical Chemistry, the purer or more active parts of any substance extracted from its inert and grosser parts by means of decoction, and formerly also by distillation, until they were of the consistence of paste.——EXTRACTIVE PRINCIPLE, a peculiar principle, supposed to form the basis of all vegetable *extracts*.

EXTRAC'TION OF ROOTS (same *deriv.*), in Algebra and Arithmetic, an operation by which the *root* of a given quantity is found; that is, a quantity which, raised to the power indicated by the *exponent* of the root, would produce the given quantity. Thus, a is the cube root of a^3, since a raised to the cube would be a^3.

EXTRAVAGAN'ZA (*Ital.*), in Music, a kind of composition remarkable for its wildness and incoherence.——Irregular dramatic pieces, generally of the burlesque cast, are also sometimes called *extravaganzas*.

EXTRAVASA'TION (*extra*, on the outside; and *vas*, a vessel: *Lat.*), a term applied to fluids when out of their proper vessels. Thus, when blood is thrown out on the brain, it is said to be *extravasated*.

EXTRE'ME (*extremus*, the last: *Lat.*), in Logic, the same as *term*. In a syllogism, the extremes are the terms of the conclusion: the *major* or greater extreme being that found in the major proposition, and the *minor*, or less extreme, that found in the minor proposition. Thus, in 'Man is an animal: Henry is a man, therefore Henry is an animal;' the word *animal* is the greater extreme, *Henry* the less extreme, and *man* the medium. The subject and predicate are the extremes of a proposition, the copula being placed between them.——In Mathematics, the *extremes* are the first and last terms of a proportion or series.

EXTRE'ME UNC'TION, one of the seven sacraments of the Roman Catholic church. It consists in the anointing various parts of the body, and the recitation of certain prayers; and is supposed to cleanse from sins not expiated by other means. It derives its name from the fact, that it is not administered unless there is some reason to believe that the recipient is near death. It is intended only for such as are in danger of death from *sickness*; and, therefore, is never received by those who are condemned to death juridically, or who are about to embark in any enterprise, however perilous.

EXTREM'ITY (*extremitas*: *Lat.*). In Painting and Sculpture, the *extremities* of the body are the head, hands, and feet.——In Anatomy, this term is applied to the limbs, as distinguishing them from the other divisions of the animal, the head and trunk.

EXU'VIÆ (*Lat.*), in Natural History, the cast skins, shells, or coverings of animals.

EY'AS (*niais*, simple: *Fr.*), in Falconry, a young hawk just taken from the nest, not able to procure its own food. It is a contraction of *faucon niais*.

EYE (*eag*: *Sax.*), in Anatomy, the organ of sight amongst mammals. It consists of many parts. The outermost membrane of the ball of the eye is called the *sclerotic* (*skleroo*, I harden: *Gr.*), and to this the muscles that move the eye are attached. Its internal surface is lined by the *choroid* (so called from a fancied resemblance to another membrane, termed *chorion*: *Gr.*), and this is continuous with the *iris*, a movable curtain floating in the aqueous humour, with a rounded opening at its middle, known as the pupil. This opening is continually varying when the eyelids are separated, according to the quantity of light. When the light is strong the pupil is made smaller; when the light is less abundant, it is enlarged. The *crystalline lens* is a pellucid body, enclosed in a delicate *capsule*, and placed in the concave depression of the front of the *vitreous humour*, a transparent and pellucid pulpy matter, filling the ball of the eye behind the lens, and covered externally by the *hyaloid* or *arachnoid* membrane. The *optic nerve* enters the back of the eyeball by a perforation in the sclerotic and choroid coats, and is spread on the posterior and interior surface of the latter, forming a nervous expansion, termed the *retina*. The eye is moved by six muscles. In speaking of the mechanism of the organ of vision, we may not improperly liken it to a natural camera obscura, provided with a ens, which, at the back of the eye, forms a icture on the retina. When the lens is oo convex, the picture falls short of the erve, and the person is short-sighted: hen the picture tends to form beyond the erve, owing to the lens not being sufficiently convex, then the person is longighted. In the first case, a concave glass s required, and in the latter a convex, as in ged persons. The principal *appendages* of he eye are the *eyelids*, with their *ciliæ* or eyeashes; the *lachrymal glands*, which secrete he tears; the *tunica conjunctiva*, a thin transarent membrane, which lines the posterior urface of the eyelids and the front part of he eyeball. Its outer surface is always noist. The small red tubercle at the inner ngle of the eyelids is called the *caruncula achrymalis*, in front and without which are the apertures known as *puncta lachrymalia*, one situate on each lid opposite the other. These are the external openings of the *lachrymal ducts*, along which the tears travel from the *lachrymal sac*, a membranous bag, situate at the inner angle of the orbit——**Eye**, in Architecture, any round window made in a pediment, an attic, the reins of a vault, &c.——**Eye**, in Gardening, a small bud or shoot, inserted into a tree, by way of graft.——**Eye** of a volute, the centre of the volute, or that point in which the helix or spiral of which it is formed commences.——**Eye** of an anchor, the hole by which the ring of the anchor is put into the shank.——**Eyes** of a ship, the parts which lie near the hawseholes, particularly in the lower compartments.——**Eye** of a dome, an aperture in the top of a dome, as that of the Pantheon in Rome, or of St. Paul's in London; it is usually covered with a lantern.

EY'EBOLT, in ships, a bar or bolt of iron, with an eye, formed to be driven into the deck or sides, for the purpose of hooking tackle to.

EY'EBRIGHT, the common name of an English wild plant, belonging to the genus *Euphrasia*, nat. ord. *Scrophulariaceæ*. It was at one time supposed to be efficacious in diseases of the eye.

EYE'-PIECE, the lens or combination of lenses, placed next the eye, in telescopes and microscopes.

EY'E-SERVICE, service performed only while under the inspection of an employer.

EYRE (*Fr.;* from *itinere*, on a journey: *Lat.*), an old law term applied to judges when travelling through the country to administer justice. They were then called justices in eyre.

EY'RIE, or **EY'RY** (*ey*, an egg: *Teut.*), the nest of a bird of prey.

F

F, the sixth letter of the English and Latin alphabets, is a labio-dental aspirate, formed by placing the upper teeth on the under lip, while emitting the breath. Its kindred letter is *v*, which is distinguished from it chiefly by being more vocal. The Romans borrowed the *digamma* or Ϝ of the Greeks, and used it inverted for some time; thus, Ⅎ, for V consonant, as DIℲI for DIVI. Some have supposed that this was done first by Claudius; but many inscriptions belonging to periods much anterior to his time exhibit this singular use of the letter. As an abbreviation on medals, monuments, &c., F. stands for *Fabius*, *Furius*, *Felix*, *Faustus*, &c.—With merchants, it signifies *folio* (page). F, in medical prescriptions and on documents, is often used for *fiat* (let it be made or done). It also stands for *Fellow*, as F.A.S. *Fraternitatis Antiquariorum Socius* (Fellow of the Antiquarian Society). F, as a numeral, with the Romans, signified 40; and with a dash over it, 40,000.——In Music, *f.* over a line means *forte; ff. fortissimo* or *molto forte;* and F is the nominal of the fourth note in the natural diatonic scale of C.

FA, in Music, one of the syllables invented by Guido Aretino, to mark the fourth note (F) of the modern scale, which rises thus: *ut* (*do*), *re*, *mi*, *fa*, &c.

FA'BIAN, an epithet signifying that line of military tactics which declines the risking of a battle in the open field, but seeks every opportunity of harassing the enemy by countermarches, ambuscades, &c. It is so called from Q. Fabius Maximus, the Roman general opposed to Hannibal.

FA'BLE (*fabula: Lat.*), a short fictitious narration, forming a didactic allegory. Fables are congenial with an undeveloped stage of thought; they pleased the man of early times and the children of modern days. Jotham's fable of the trees is the oldest that is extant. Nathan's fable of the poor man is next in antiquity. We find Æsop in the most distant ages of Greece; and in the early days of the Roman commonwealth, we read of a mutiny appeased by the fable of the belly and the members. ——**Fable**, the plot of an epic or dramatic poem: this, according to Aristotle, is the principal part, and, as it were, the soul of the entire poem.

FAB'ULOUS AGE (*fabulosus*, from *fabula*, a fictitious narrative: *Lat.*), that period in the history of every nation in which supernatural events are represented to have happened. The fabulous age of Greece and Rome is called also the *heroic* age.

FAÇA'DE (*Fr.*), in Architecture, the front or face of an edifice. As, in most buildings, only one side is conspicuous, viz. that which faces the street, and usually contains the principal entrance, this has been, in a special manner, denominated the façade

FACE (*Fr.*), in Geometry, one of the plane surfaces of a polyhedron.——In Fortification, a line of rampart, or the extent between the two outermost points of two adjacent bastions.

FA'CETS (*facettes: Fr.*), small faces or planes in brilliant and rose diamonds.

FA'CIAL LINE or AN'GLE. These terms are used in describing the conformation that exists in the bones of the face A small angle indicates projecting jaws, a high angle, that the forehead overhangs the jaws. Suppose a straight line drawn at the base of the skull from the great occipital cavity across the external orifice of the ear to the bottom of the nose. If we draw another straight line from the bottom of the nose, or from the roots of the upper incisor teeth, to the forehead, then both lines will form an angle, which will be more acute in brutes, the less the shape of their face resembles that of men. In apes, this angle is only from 45° to 60°; in the orang-outang, 63°; in the skull of a negro, about 70°; in a European, from 75° to 85°. In Grecian statues, this angle ordinarily amounts to 90°, that is a right angle.

FA'CIES HIPPOCRAT'ICA (Hippocratic face: *Lat.*), in Medicine, that deathlike appearance which consists in the nostrils being sharp, the eyes hollow, the temples low, the tips of the ears contracted, the forehead dry and wrinkled, and the complexion pale or livid. It is so called from Hippocrates, by whom it has been so correctly described in his *Prognostics*.

FAC-SIM'ILE (*facere*, to make; and *simile*, like: *Lat.*), an imitation of an original in all its traits and peculiarities.

FAC'TION (*factio: Lat.*), in Antiquity, one of the troops or companies of combatants in games of the circus. They were four in number; the green, blue, red, and white, to which the purple and yellow were added by Domitian.——FACTION, in modern times, a party in political society, combined or acting in union, in opposition to the government. The term is usually, but not necessarily, applied to a minority, and is now employed in an opprobrious sense.

FACTI'TIOUS (*factitius*, artificial: *Lat.*), in Chemistry, &c., any epithet for what is made by art, in distinction from what is produced by nature; as, *factitious* cinnabar

FAC'TOR (a maker: *Lat.*—he is a maker of bargains), in Commerce, an agent employed to dispose of goods, consigned or delivered to him by or for a principal, and paid by a commission He may buy or sell for his principal in his own name, whilst a broker must always name his principal. He is entrusted with the possession, control, and disposal of the goods. He has a special property in them, and a lien on them for what may be owing to him. He may pledge the goods for advances, made on account of the principal, or for advances to himself as far as his lien extends. A factor is liable criminally for pledging goods for his own benefit in violation of good faith. A buyer or pawnee without notice is protected in his dealings with a factor, who has possession of bills of lading, warrants, &c., and his *bonâ fide* contracts are valid.

FAC'TORY (*factura*, a making: *Lat.*), an establishment supplied with machinery for the purpose of carrying on any branch of manufacture. Until 1802, no statutes existed regarding the employment of children in mills or factories. In 1833, inspectors of factories were appointed; and it was prohibited by law to employ any young person or female under eighteen years of age in any factory, before six in the morning or after six in the afternoon, or on Saturdays after two in the afternoon; and all young persons under thirteen years of age are bound to attend school during some period of the day.

FAC'ULÆ (*facula*, a little torch: *Lat.*), in Astronomy, a name given to certain bright spots in the sun.

FAC'ULTY (*facultas: Lat.*), a term used to denote the powers or capacities of the human mind, viz. understanding, will, memory, imagination, &c. If it be a power exerted by the body alone, it is called a *corporeal* or animal faculty; if it belong to the mind, it is called a *rational* faculty; and it may further be distinguished into a *natural* faculty, or that by which the body is nourished, and a *vital*, or that by which life is preserved, &c.——FACULTY, a term applied to the different departments of a university, divided according to the arts and sciences taught there. In most universities there are four faculties: of arts, including humanity and philosophy; of theology; of physic; and of civil law The degrees in the several faculties of our universities are those of bachelor, master, and doctor ——FACULTY, in Law, a privilege granted to a person, by favour and indulgence, of doing that which, by the strict letter of the law, he ought not to do.——FACULTY OF ADVOCATES, a term applied to the college or society of advocates in Scotland, who plead in all actions before the court of session, justiciary, and exchequer. Their elective president is termed *Dean of Faculty*.

FÆ'CES (*Lat.*), in Chemistry, dregs, impurities, or sediment that settles at the bottom after distillation, fermentation, &c

FA'GUS (*Lat.*), in Botany, a genus of plants, nat. ord. *Corylaceæ*, including the common beech tree *F. sylvatica*, which rises to the height of sixty or seventy feet. Its flowers are produced in globular catkins, and are succeeded by angular fruit called *mast*, which, like acorns, serves as food for swine. Its bark has a peculiar silvery appearance, which, added to the gracefulness of its growth and the elegance of its foliage renders it a beautiful object in forest scenery. Its wood is much employed in turnery and for chairs.

FAHL'ERZ, in Mineralogy, grey copper ore; sometimes called tetrahedral copper pyrites.

FAH'LUNITE (because found at *Fahlun*), in Mineralogy, a sub-species of octahedral *Corundum*. It is a hydrated silicate of alumina.

FAI'ENCE, or IMITATION PORCELAIN, a kind of pottery, superior to the common sorts in its glazing, beauty of form, and richness of painting. It derived its name from the town of Faenza, in Romagna, where it is said to have been invented in 1299. It reached its highest perfection in the 16th century; and some pieces which were painted by the great artists of the period are highly valued as monuments of early art.

FAINTS (*faner*, to fade away: *Fr.*), in the distillation of whiskey, the weak spirituous liquor that runs off first and last from the still. This crude spirit is much impregnated with fœtid essential oil, and is therefore very unwholesome.

FAIR (*feriæ*, holidays: *Lat.*), a kind of market, on an extensive scale, granted to a town, by privilege, for the more speedy and commodious providing of such things as the place stands in need of. The most important fairs now held are probably those of Germany; and particularly of Leipsic, where books form so important a branch of commerce. But neither at home nor abroad can they have the importance they formerly had, because the communication between different places is now so easy, that merchandise may be readily obtained direct from the locality in which it is produced or manufactured. At all fairs held within ten miles of Temple Bar, business and amusements of every kind must cease at 11 o'clock in the evening, and not recommence before 6 o'clock in the morning.

FAI'RY (*ferhth: Sax.*), an imaginary spirit or being. Fairies were supposed to assume a human form, though they were of an extremely diminutive size; to be distinguished by a variety of fantastical actions, good or bad; and always to exercise a magic power over mortals. In an age of ignorance, the imagination easily substitutes a poetical mythology in the place of natural causes. The *Fata* of the Italians, whence the French derived the word *fée*, is not identical with our fairy; being a kind of prophetess. The Italians, as well as the Arabians, had stories of a country inhabited by fairies.——FAIRY RING or CIRCLE, a phenomenon frequently seen in the fields, consisting of a bare, and seemingly beaten track, round a circular space, covered with grass, and formerly ascribed to the dances of the fairies. It has been supposed by some, that these rings are the effect of lightning; but a more rational theory ascribes them to a kind of fungus, which grows in a circle from the centre outwards, destroying the grass as it extends. The interior of the circle, being enriched by the decayed roots of the fungi, is soon covered again with verdure.

FAKIR' or FAQUIR' (poor: *Arab.*), a devotee, or Indian monk. The fakirs are a kind of fanatics in the East Indies, who retire from the world and give themselves up to contemplation. Their great aim is to gain the veneration of the world by their absurd and cruel penances, outdoing even the mortifications and severities of the ancient anchorets. Some of them mangle their bodies with scourges and knives; others never lie down; and others remain all their lives in one posture. Some classes of them, however, avoid these absurdities.

FALCA'DE (*falx*, a sickle: *Lat.*, from the form assumed by the horse's legs), in Horsemanship, the act by which the horse throws himself upon his haunches; as in very quick curvets.

FAL'CATED (*falcatus*, scythe-shaped: *Lat.*), an epithet for anything in the form of a sickle: thus, the moon is said to be *falcated* when she appears horned.

FAL'CHION (*fauchon: Fr.*; from *falx*, a sickle: *Lat.*), a kind of sword, having its extremity turned up somewhat like a hook.

FAL'CIFORM PRO'CESS (*falx*, a sickle; and *forma*, a form: *Lat.*), in Anatomy, a process of the *dura mater*, in the form of a sickle. It separates the two hemispheres of the brain.

FAL'CO (a falcon, from *falx*, a sickle: *Lat.*, on account of the shape of its bill), in Ornithology, a genus of ancipitrine diurnal birds. They are characterized by a powerful beak, generally armed with a kind of tooth on each side, near the apex; their wings are strong, long, and pointed; and they are remarkable for courage and activity. The superciliary arch projects above the eye, giving them a bold and threatening physiognomy. Most of them subsist on living prey. Their first plumage differs from that of maturity, which is not acquired before the third or fourth year; but so rapid is the growth of the true falcons, that in three months the young equal the old ones in size. The female is generally one-third larger than the male. There are several species in the British Isles, the best known of which are the Gyr falcon (*F. Islandicus*), the Peregrine falcon (*F. peregrinus*), the Hobby (*F. subbuteo*), the Merlin (*F. æsalon*), and the Kestrel (*F. tinnunculus*).——In Heraldry, the falcon is usually represented on coats of arms with bells on its legs, and also decorated with a hood, virols, rings, &c.

FALCONET' (*falconette*, literally a small falcon: *Fr.*), a small cannon, or piece of ordnance used in former times.

FAL'CONRY (*falco*, a falcon: *Lat.*), the art of training all kinds of hawks, but more especially the *Falco peregrinus*, called the *gentle falcon*, for the sport of hawking. This was much practised in Europe and Asia in the chivalric ages, and continued a favourite amusement till the 17th century; but the invention of firearms gradually superseded it. 'In the language of Falconry,' says Yarrell, 'the female peregrine is exclusively called the Falcon, and on account of her greater size, power, and courage, is usually flown at herons and ducks. The male peregrine being sometimes one-third less than the female, is called the tiercel or tiercelet, and is more frequently flown at partridges and sometimes at magpies.' In France, England, and Germany, falconry was at one time in such high esteem, that during the reign of Francis I. of France, his grand falconer received a salary of 4,000 livres a year, had under him fifteen noblemen and fifty falconers, and enjoyed the privilege of hawking through the whole kingdom at pleasure. His entire establishment, which cost annually about 40,000 livres, attended the king wherever he went, and those who were distinguished for their skill in the sport were loaded with royal favours. In England, also, falconry was greatly valued as a recreation; and there is to this day an hereditary grand falconer (the Duke of St. Alban's), who, by virtue of his office, presents the sovereign with a cast of falcons on the day of the coronation. A similar service is performed by the person who represents the Stanley family, in the Isle of Man.

FAL'DAGE (*faldagium: Mod. Lat.*; from *fald*, a fold: *Sax.*), a privilege which certain lords anciently reserved to themselves of setting up folds for sheep in any fields within their manors, the better to manure them.

FAL'LACY (*fallacia*, deceit: *Lat.*), a logical artifice, or an argument framed so as to deceive; a sophism. The word is now frequently employed erroneously to signify a simple mistake.

FALL'ING SICK'NESS. [See EPILEPSY.]

FALL'ING STARS. [See AEROLITES.]

FALLO'PIAN TUBES, in Anatomy, two canals or ducts arising in the womb and terminating in the ovarium. They received their name from Gabriel Fallopius, a celebrated Italian anatomist and physician of the 16th century, who is said to have first ascertained their office.

FAL'LOW (*falewe*, pale yellow: *Sax.*), a term applied to land which is left uncultivated for one or more years. *A naked* fallow is one in which the soil remains a whole year without any kind of crop. A *turnip* or *green crop* fallow is one in which the land is left idle from harvest till the beginning of summer, and is then sown with turnips, or similar crops, in rows. Fallowing was practised by the Romans, and it was very common among ourselves until the middle of the last century. But where a proper rotation is adopted, fallowing is unnecessary, except in strong clays; and probably not even in these, if they are properly drained.

FAL'LOW-DEER (same *deriv.*), the *Dama vulgaris* of zoologists. It has a brownish bay colour with pale spots. Its horns are broad and palmated: their extremities point a little forward, and are branched on the hinder sides; unlike the stag, every branch of whose horn is shaped like the stem that supports it, the fallow-deer has two sharp and slender brow antlers, and above them two small slender branches. These horns are made into knife-handles, and similar articles. This animal usually forms one of the ornaments of English parks. Persia is its native country.

FALSE CA'DENCE (*falsus*, false: *Lat.*), in Music, one in which the bass rises a tone or semitone, instead of rising a fourth or falling a fifth.

FALSE KEEL, the timber added below the main keel, both as a defence and as a means of making the ship hold a better wind.

FALSE ROOF, in Carpentry, that part of a house which is between the roof and the covering.

FALSET'TO (*Ital.*), in Music, that species of voice in a man, the compass of which lies above his natural voice.

FAMILIAR SPIRITS (*familiaris*, familiar: *Lat.*), demons, or evil spirits, supposed to be continually within call, and at the service of their masters; sometimes under an assumed shape, sometimes compelled by magical skill, and sometimes doing voluntary service. In Eastern stories, nothing is more common than the mention of magic gems, rings, &c., to which are attached genii, sometimes good, sometimes bad. The genius or *daimōn*, which Socrates and some other celebrated ancients were said to have had as companions, was a kind of *familiar*.

FAM'ILY (*familia: Lat.*), in Natural History, a tribe of animals or vegetables allied to each other by certain distinctive characteristics.——FAMILY OF CURVES, in Mathematics, a congeries of several kinds of curves, all of which are defined by the same equation, but in a different manner, according to their different orders.

FANAT'IC (*fanaticus*, from *fanum*, a temple: *Lat.*), an enthusiastic visionary person, who, in religious matters, adopts extravagant opinions. The expression was anciently given to a set of prophetic priests, who passed their time in temples (*fana*), and being often seized with a kind of enthusiasm, as if inspired by the divinity, exhibited wild and frantic gestures.

FANDAN'GO, an old Spanish dance, which proceeds gradually, from a slow and uniform, to the most lively motion. It is seldom danced but at the theatre, and in the parties of the lower classes; nor is it, in these cases, even customary to dance it with those voluptuous looks and attitudes which distinguish the true fandango. There is another species of fandango, called the *bolero*, the motions and steps of which are slow and sedate, but grow rather more lively towards the end. In these dances the time is beaten by castanets.

FANFAR'E (*Fr.*), a short, lively, loud, and warlike piece of music, composed for trumpets and kettle-drums. Also, short lively pieces, performed on hunting-horns, in the chase. From it are derived *fanfaron*, a boaster, and *fanfaronade*, boasting.

FAN-PALMS, palms with leaves like fans. [See PALM.]

FANTA'SIA (a fancy: *Ital.*), in Music, the name generally given to a species of composition, supposed to be struck off in the heat of the imagination, and in which the composer is allowed to give free range to his ideas, unconfined by the rules of science. Some limit the term to mere extemporaneous effusions, which are transitive and evanescent; differing from the *capriccio* in this—that though the latter is wild, it is the result of premeditation, and becomes permanent; whereas the *fantasia*, when finished, is thought of no more.

FARCE (*farcire*, to stuff: *Lat.*), a dramatic piece or entertainment, of a low, comic character. It was originally a droll, or petty show, exhibited by mountebanks and their buffoons in the open streets to gather the people together. It has, however, long been removed to the theatre; and instead of being performed by merry-andrews, to amuse the rabble, is acted by comedians, and has become the entertainment of a polished audience. As the aim of a farce is to promote mirth, the dialogue is not refined, nor is there any opportunity lost to excite laughter, however wild or extravagant the plot, or however ridiculous the characters. The farce is restricted to three acts, and frequently contains only two. The French *vaudeville* corresponds to the English farce.

FARI'NA (*Lat.*), the mealy albumen of cereal grains. It consists chiefly of starch.

FAR'MERS-GE'NERAL. These were persons who, under the old French monarchy, farmed the government taxes; that is, they paid a certain sum into the treasury, and then collected the taxes on their own account. In 1728 these contractors were formed into a company. Although they were at a vast expense in the collection, they made large profits. One chief cause of the Revolution was the oppressive nature of the taxes thus collected, and by that outbreak the *fermiers-généraux* were swept away.

FAR'RIERY (*ferrier*, a farrier; from *fer*, iron: *Fr.*), the art of preventing or curing the diseases of horses. This is now generally called the *veterinary* art; and the smith whose business it is to shoe horses is denominated a farrier.

FAS'CES (*Lat.*), in Roman Antiquity, bundles of rods, with an axe projecting from one end of each bundle, and carried by officers called *lictors*, before consuls and others. They were popularly believed to have been derived from the kings, and they were considered emblems of supreme power, the axe signifying the power to decapitate, and the rods the power to beat the criminal, as was usual before capital execution. The civic prætors had two fasces, proconsuls and provincial prætors six, consuls twelve, and dictators twenty-four. The consuls had all their fasces in turn.

FAS'CIA (*Ital.*), in Architecture, any flat member having a considerable breadth and but a small projecture, as the band of an architrave, larmier, &c.——In Astronomy, the bright stripes or belts observed on the discs of some planets, particularly Jupiter. ——In Anatomy, the tendinous expansions of the muscles.

FASCIC'ULITE (*fasciculus*, a bundle: *Lat.;* and *lithos*, a stone: *Gr.*), in Mineralogy, a variety of fibrous hornblende, of a fascicular structure.

FASCIC'ULUS (a bundle: *Lat.*), in Medicine, denotes a handful, or, according to some, as much as can be taken up in the arm when bent.——FASCICULUS, in Botany, a species of inflorescence similar to the corymbus, except that the expansion is centrifugal instead of centripetal.

FASCINA'TION (*fascinatio: Lat.*), the fact of being charmed, operated upon, or influenced by the look of certain persons: it is generally taken in an evil sense. A belief in fascination appears to have been very generally prevalent in most ages and countries. Until very recently, it was prevalent among the Scotch Highlanders and the inhabitants of the western islands, where the fear of the evil eye has led to various precautions against its influence; and in some remote districts it is not even yet extinct. In Turkey, when a child is born, it is immediately laid in the cradle and loaded with amulets, while the most absurd ceremonies are used to protect it from the noxious fascination of some invisible demon. Nay, the evil eye is there feared at all times, and supposed to affect persons of all ages, who, by their prosperity, may be the objects of envy. It is equally a source of terror to the lower orders at Naples.

FAS'CINES (*Fr.*), in Fortification, small branches, or bavins, bound up in bundles, and used in raising batteries, filling up moats, binding ramparts where the earth is bad, making parapets, &c.

FASH'ION-PIECES, in ships, the hindmost timbers which terminate the breadth, and form the shape of the stern.

FAS'SITE, in Mineralogy, a variety of augite, found in *Fassa*, in the Tyrol.

FAS'TI (*Lat.*), in Antiquity, the name given to the Roman calendar, in which were set down all days of feasts, pleadings, games, ceremonies, the names of public officers, and the different important matters, changeable each year. Ovid wrote a poem, describing the Roman festivals, their origin, &c., but only half of it has come down to us.

FASTS (*fasten*, to fast: *Ger.*), occasional abstinence from food, on days appointed by public authority to be observed in fasting and humiliation. Solemn fasts have been observed in all ages and nations, especially in times of mourning and affliction. The Jews, besides their stated fast days, occasionally enjoined others in the time of any public calamity. They were observed upon the second and fifth days of the week, beginning an hour before sunset, and continuing till midnight of the following day. The Jews, on these occasions, always wore *sackcloth* next their skins, rent their clothes, which were of coarse white stuff, sprinkled ashes on their heads, went barefoot, and neither washed their hands nor anointed their bodies as usual. They thronged the temple, made long and mournful prayers, and had every external appearance of humiliation and dejection. In order to render their abstinence complete, they were allowed to eat nothing at night but a little bread dipped in water, with some salt for seasoning, unless they chose some bitter herbs and pulse. In the Roman Catholic church *fasting* differs from *abstinence*, in being a refraining for a certain time from all kinds of food. The distinction was not known in ancient times.

FAT (*fett: Ger.*), oleaginous matter secreted by the blood, and deposited in the adipose tissues of animal bodies.—Fats vary in consistence, colour, and smell, according to the animals from which they are obtained: thus, they are generally fluid in the cetaceous tribes, soft and rank-flavoured in the carnivorous, solid and nearly scentless in the ruminants, usually white and copious in well-fed young animals, yellowish and more scanty in the old. Their consistence varies also according to the organ of their production, being firmer under the skin, and in the neighbourhood of the kidneys, than among the movable viscera. The animal oils and fats combine with the alkalis, and form perfect soaps. With some of the earths, and metallic oxides also, they produce saponaceous compounds; and they even facilitate the oxidation of some of the metals, as copper and mercury, by the atmospheric air. Animal fat is not homogeneous, but consists of four proximate principles, viz. stearine, margarine, oleine, and glycerine, the two former being solid, and the two latter fluid, at ordinary temperatures. The first three are compounds of carbon, hydrogen, and oxygen, with water; the last is a compound of carbon, hydrogen, and oxygen, without water. As to the applications of the fats, see CANDLES and SOAP.

FA'TALISM (*fatalis*, fatal: *Lat.*), the belief in an unchangeable destiny, to which everything is subject, or the doctrine which teaches that all events take place by an inevitable necessity.

FA'TA MORGA'NA (the fairy Morgana: *Ital.*), a singular aerial phenomenon occasionally seen in the straits of Messina. This peculiar atmospherical refraction is not, however, altogether confined to that locality, having occasionally been seen on our own coasts. It consists in the appearance in the air, over the surface of the sea, of multiplied images of the objects on the surrounding coasts. They are cases of an unusually strong *mirage*.

FATE (*fatum*: *Lat.*), destiny depending on a superior cause, and uncontrollable. According to the Stoics, every event is the result of fate. In the sense in which the moderns use the word, it implies the order or determination of Providence.

FA'THER (*vater*: *Ger.*), a term applied, in Church History, to ancient authors who have preserved in their writings the traditions of the Church. No author who wrote later than the 12th century is dignified with the title of *father*. The primitive fathers are usually considered to be: Clemens Romanus, bishop of Rome, who d. A.D. 100; Ignatius, bishop of Antioch, who d. 107; Polycarp, bishop of Smyrna, who suffered martyrdom, 167; Justinus, who suffered martyrdom at Rome; Theophilus, bishop of Antioch, who d. about 180; Irenæus, who suffered martyrdom; Clement of Alexandria, who d. about 220; Cyprian, bishop of Carthage, who suffered martyrdom about 258; Origen of Alexandria, who d. about 254; Gregory, bishop of Neo-Cæsarea, who d. about 264; Dionysius, bishop of Alexandria, who d. 265; Tertullianus, who died in the reign of Alexander Severus. In the fourth century, after Christianity had been embraced by the emperors, the following are enumerated as the fathers of the Greek or Eastern Church; Eusebius of Cæsarea, d. 340; Athanasius, bishop of Alexandria, d. 371; Basilius the Great, bishop of Cæsarea; Gregorius Nazianzenus, d. 389; Gregorius, bishop of Nyssa, d. 396; Cyril, bishop of Jerusalem, d. 386; St. John Chrysostom, patriarch of Constantinople, d. 407; Epiphanius, bishop of Salamis, d. 403; Cyril, bishop of Alexandria, d. 444; Ephraim the Syrian, d. 378. The fathers of the Latin or Western Church were Lactantius, d. 316; Hilarius, bishop of Poictiers, d. 368; Ambrose, archbishop of Milan, d. 397; Jerome, d. 420; Augustine, bishop of Hippo, d. 430.

FATH'OM (*fædm*: *Sax.*), a measure of six feet, used chiefly at sea in sounding the depth of water.

FAULT (*fautes*: *Fr.*), a term applied by miners and geologists to a fracture across a series of strata, one side of which has been elevated or depressed out of correspondence with the other side. In the Great Pennine Fault, in the north of England, there is a difference of 1000 yards in height between the beds on one side and the same beds on the other.

FAU'NA (*fauni*, rural deities: *Lat.*), a general term by which the whole of the animals of a country are designated. *Avi-fauna*, the birds of a particular country.

FAUNS (*fauni*: *Lat.*), rural deities, among the Romans, represented with horns on their heads, sharp pointed ears, and the rest of their bodies like goats. They were the mythological demi-gods of woods and forests, and hence were called *sylvan* deities.

FAUX JOUR (a false light: *Fr.*), a term used in the fine arts, and signifying that a picture is placed so that the light falls upon it in a direction differing from that in which the painter has represented the light as thrown upon the objects it represents; or that it is covered with a bright glare, so that nothing can be properly distinguished.

FAWN (*faon*, from *fauve*, fawn-coloured: *Fr.*), a young deer; a buck or doe of the first year.

FE'ALTY (*fidelitas*, faithfulness: *Lat.*), in Feudal Law, an oath taken on the admittance of any tenant, to be true to the lord of whom he held his land. Under the feudal system of tenures, every vassal or tenant was bound to be true and faithful to his lord, and to defend him against his enemies; the tenant was called a *liege man*, the land a *liege fee*, and the superior a *liege lord*.

FEASTS or FES'TIVALS (*festivitas*, a festival: *Lat.*), in a religious sense, anniversary times of feasting and thanksgiving, such as Christmas, Easter, &c.——Among Christians, they were observed in the church from the very beginning. But, in process of time, the number became inconveniently great. The English church retains only the Nativity, Circumcision, Epiphany, the death, resurrection, and ascension of Christ; the purification and annunciation of the Virgin; Whit-Sunday, Trinity Sunday, the festivals of the most remarkable apostles and evangelists, and All-Saints. Festivals are either *movable* or *immovable*. The former depend on Easter: the latter are assigned to fixed days.

FEASTS OF THE AN'CIENTS. These were conducted with great ceremony. The guests wore white garments, decorated themselves with garlands, and often anointed the head, beard, and breast with fragrant oils. The banqueting-room was also often adorned with garlands; and roses were hung over the table, as the emblem of silence: hence the common phrase, to communicate a thing *sub rosâ* (under the rose). The luxurious Romans drank out of crystal, amber, and the costly *murra* (a kind of porcelain introduced by Pompey), as well as onyx, beryl, and elegantly wrought gold, set with precious stones. After the meal was ended, flute-players, female singers, dancers, and buffoons of all kinds, amused the guests; or the guests themselves joined in various sports and games.

FEATH'ERS (*feder: Ger.*), consist of a tube, a shaft, and barbs or vanes. The *tube* is a hollow, transparent, horny cylinder; the *shaft* is elastic, and contains a white, dry, and very light pith; the *barbs*, which run in a uniform direction and cover each side of the shaft, are broad on one side and narrow on the other: the *barbules* are attached to the sides of the barbs. The feathers of birds are periodically changed, which is called *moulting*. When part of a feather is cut off it does not grow again; and a bird whose wings have been clipped remains in that state till the next moulting season, when the old stumps are shed, and new feathers are produced. Chemically analyzed, feathers seem to possess nearly the same constituents as hair.—They may be considered as of four kinds: 1. quills, or the feathers of the wings; 2. those which cover the body; 3. the down which grows close to the skin; and 4. the long ones of the tail. The goose, the turkey, and the crow supply those of the first description, employed in writing. The down of the swan is sometimes made into muffs and other articles of dress. Goose feathers are most esteemed for beds: and they are best when plucked from the living bird, which is done, very inhumanly, thrice a year, viz. in the spring, midsummer, and beginning of harvest. The plumage of the eider-duck, called *eider-down*, possesses in a superior degree all the good qualities of goose down, but should be used only as a *covering* to beds, since much pressure destroys its elasticity. ——Feathers make a considerable article in commerce, particularly those of the ostrich, heron, swan, peacock, turkey, goose, and duck. They also afford a source of employment to the artisans who prepare them for female use, or for military purposes. ——Ostrich feathers are imported from Algiers, Tunis, Alexandria, Madagascar, and Senegal.

FEB'RIFUGE (*febris*, a fever: and *fugo*, I drive away: *Lat.*), in Medicine, an appellation given to such medicines as mitigate or remove a fever.

FEB'RUARY (*februum*, in the Sabine language, a purification), the second month of the year, reckoning from January. February derived its name from the *Februa*, a feast held by the Romans on the 15th of this month, in honour of Lupercus, the god of fertility, and as a purification of the land. In a common year it consists of only 28 days, but in the bissextile year it has 29, on account of the intercalary day then added to it.

FED'ERAL GOV'ERNMENT (*fœdus*, a league: *Lat.*), one that consists of several independent provinces or states, united under one head; but the extent to which such states give up their individual rights may be very different, although, as relates to general politics, they have one common interest, and agree to be governed by one and the same principle. The United States of America afford an example of this form of government.

FEE, ESTATE IN (*feoh*, cattle: *Sax.*, be[illegible] the only property in very early states of society), in Law, properly signifies an inheritable estate in land, held of some superior or lord; and in this sense it is distinguished from *allodium*, which is an absolute property in land. It is the *theory* of the English law that all the lands of the kingdom, except the royal domains, are held in fee, or by a tenure, of some superior lord, the absolute or allodial property being only in the king; so that all the tenures are strictly feudal. The most ample estate a person can have is that of *fee-simple*, or one which he holds to himself and his heirs general, both lineal and collateral, male and female; and such an estate can be had only in property that is inheritable, and of a permanent nature. *Fee conditional*, or *fee-simple conditional*, is when the estate to a man and his heirs is qualified by a condition or limitation, such as his paying a certain sum of money on a stipulated day, &c. But it is generally understood to refer to a limitation, in the form of donation to some *particular* heirs; as, the *heirs of his body*. ——FEE-FARM, a kind of tenure without homage, fealty, or other service, except that mentioned in the feoffment; which was usually the full rent. The nature of this tenure was, that if the rent was in arrear or unpaid for two years, the feoffor or his heirs might have an action for the recovery of his lands. No grant in fee-farm can now be made.

FEEL'ERS (*fuhlen*, to feel: *Ger.*), or PALPI, in Entomology, short jointed processes proceeding from the mouth, and very conspicuous in some insects. They are not to be confounded with *antennæ*, which are jointed bodies, situated on each side of the head.

FEEL'ING (*fühlend: Ger.*), one of the five physical senses, by which we obtain the ideas of solid, hard, soft, rough, hot, cold, wet, dry, and other tangible qualities. This sense is the coarsest, but at the same time it is the surest of the five; it is besides the most universal. We see and hear with small portions of our body, but we feel with all. Nature has bestowed that general sensation wherever there are nerves, and they are everywhere, where there is life. All the nervous solids, while animated by their fluids, have this general sensation; but the papillæ in the skin, those of the fingers in particular, have it in a more exquisite degree.

FEINT (feigned: *Fr.*), in Military tactics, an attack made to conceal the true one.

FE'LIDÆ (*felis*, a cat: *Lat.*), a family of carnivorous mammals, including the lion, tiger, leopard, jaguar, lynx, cat, and other animals. In this family the organs of destruction reach their highest development. They are strong and agile, armed with sharp talons and teeth, set in powerful jaws.

FEL'LOES (*felge: Dan.*), the pieces of wood which form the circumference or circular part of a wheel.

FEL'LOW (*felow: Sax.*), a superior member of a college. Fellows are, *in general*, graduates; and, in most cases, are obliged to abandon their fellowships at a certain time, if they do not take orders: there are, however, lay fellowships. Fellowships are vacated by the marriage of the holder. In some colleges, there is a distinction, in point of emolument, between *senior* and *junior fellows*. Fellowships are very various in value, some being worth 100*l.* per annum, or less, and others 600*l.*; the average is from 150*l.* to 300*l.*—The members of most societies incorporated by charter for the prosecution of some branch of science are usually styled fellows.

FEL'LOWSHIP (same *deriv.*), in Arithmetic, a rule by which the loss and gain of each particular person in a joint-stock concern is discovered.

FE'LO-DE-SE (a felon with reference to himself: *Mod. Lat.*), in Law, a person who, being of sound mind, and of the age of discretion, wilfully causes his own death. The goods and chattels of a *felo-de-se* are forfeited to the king; but the coroner's jury, summoned to inquire into the cause of death, &c., frequently saves the forfeiture, by finding a verdict of lunacy, on the supposition that it is impossible for a person in his senses to do a thing so contrary to nature. Formerly, persons committing suicide were buried in the highway, with a stake driven through the heart: at present, the law requires that their interment shall take place in a burial-ground, between the hours of nine and twelve at night.

FEL'ONY (*felon*, a felon: *Fr.*; from *fel*: *Sax.*), comprehends all crimes which, at common law, occasion the forfeiture of lands and goods; and therefore, strictly speaking, it includes treason, though, in common language, it is not understood to do so. Its punishment, unless otherwise marked out, is death. The principal species of felony are:—1. Murder, manslaughter, rape, and other serious crimes against the person. 2. Larceny. 3. Embezzlement. 4. Burglary. 5. Malicious injury to property, such as arson, riotous demolition of churches, houses, &c. 6. Forgery. 7. Many offences of a public nature.

FEL'SPAR or **FELD'SPAR** (*feldspath*, literally field-spar: *Ger.*), a mineral compound of silica, alumina, and potash, with traces of lime, and often of oxide of iron. It is one of the constituents of granite, is softer than quartz, and usually white, greyish, or reddish. The general figure of the numerous crystals of felspar is an oblique prism, with unequally produced planes, whose number varies from four to ten. These prisms are terminated by summits, ordinarily composed of two large culminating faces, and several smaller faces, which seem to obey no constant law of arrangement: hence it results, that the forms of felspar are among the most difficult of any to understand and describe. Common felspar, in which potash is the predominant alkali, is often called *orthoclase*. Where soda is the predominant alkali, it has received the name of *albite*. In the variety called *Labradorite*, there is from 8 to 11 per cent. of lime present. A fourth variety is termed *oligoclase*. In its decomposed state, felspar furnishes the *petuntse*, or Cornish stone, so much used in the porcelain and best pottery manufactures.

FELT (*filz*: *Ger.*), coarse wool, fur, or hair, matted together in a peculiar way, and used in the making of hats, &c. The method of working up such materials into a species of cloth, independently of either spinning or weaving, is called *felting*, and consists in causing the hairs to interlace with each other, which they readily do by virtue of their tendency to curl, and of the minute serratures with which they are ringed throughout their length. For this purpose, they are intimately mixed together by the operation of *bowing*, which is effected by means of the vibrations of an elastic string, the rapid alternations of whose motion are peculiarly well adapted to remove all irregular knots and adhesions among the fibres, and to dispose them in a very light and uniform mass. This, when pressed under cloths and leather, readily unites into a fabric of some firmness; and this is brought to the proper shape by various subsequent operations.

FELUC'CA (*Ital.*), a small vessel, carrying two masts, and propelled by oars and sails. Also, small war-boats. Feluccas are used in the Mediterranean.

FE'MALE SCREW, a screw, the spiral thread of which is cut on the inner surface of a hollow cylinder.

FEME COV'ERT (*femme couverte*, a sheltered woman: *Fr.*), in Law, a married woman who is under covert of her husband. By the common law of England, the legal capacity of a woman to contract, or sue and be sued, separately, ceases on her marriage; and her husband becomes accountable for her debts existing at that time.——FEME SOLE, a single woman.——FEME-SOLE MERCHANT, a woman who carries on trade alone, or without her husband.

FEM'ORAL (*femur*, the thigh: *Lat.*), belonging to the thigh; as, the *femoral* artery.

FEN (*fenn*: *Sax.*), a portion of land, in which the sub-soil is constantly saturated with water, and the surface liable to be overflowed in spring and autumn. The soil is generally dark and rich, and produces bushy crops of grass and corn. Fens can seldom be drained naturally; but when this is done by machinery, they are highly productive. Windmills were formerly much employed in draining them; but steam is now preferred, as most to be depended on.

FEN'CING (*défense*: *Fr.*), the art of using skilfully a sword or foil, either in attack or defence. In practising this art, foils or thin swords are used, which, being blunted or covered at the points, and bending readily, are harmless.

FEN'DERS (*défendre*, to defend: *Fr.*), a sea term for pieces of old cable, &c., hung over the sides of a ship, to prevent injury from contact with other ships.

FENES'TRA (a window: *Lat.*), in Anatomy, a term applied to two openings, or *foramina*, within the ear, distinguished by the names of the oval and the round fenestra

FEN'NEL (*fenouil: Fr.*), the common name of the *Anethum fœniculum*, an umbelliferous plant, with a peculiar fragrance. It is wild in England.

FEO'DUM, FE'OD, or **FEUD** (*feodum*, a fief: *Mod. Lat.*), in Feudal Law, the right which the vassal had to use and take the profits of land, &c., rendering to his lord such fees, duties, and services as belonged to military tenure. But the actual property in it always remained to the lord.

FEOFF'MENT (*fief*, a fief: *Fr.*), the old common law method of conveying lands to another in *fee*, that is, to him and his heirs for ever, by delivery of seisin, and possession of the estate granted. The giver is called the *feoffor*, and the person who is thus invested is called the *feoffee*. This mode of conveyance is very seldom used.

FE'RÆ (wild beasts: *Lat.*), in Zoology, an order of mammals, including the rapacious beasts, or those that subsist, more or less exclusively, on the flesh of other animals. They are characterized by the possession of *incisors*, *canine*, and *molar* teeth, and unguiculate extremities, without an opposite thumb on the forefoot, but with the power of rotation in the forearm. It includes five families: *Felidæ*, the cat-tribe; *Ursidæ*, the bears; *Talpidæ*, the moles; *Macropidæ*, the kangaroos; and *Phocidæ*, the seals.

FE'RÆ NATU'RÆ (of a savage nature: *Lat.*), in Law, beasts and birds that are wild; as foxes, hares, wild ducks, &c., in which no person can claim any property.

FERA'LIA (*Lat.*), in Antiquity, a festival observed among the Romans in February, in honour of the *manes* of their deceased friends and relations. During the ceremony, which consisted in making offerings at their graves, marriages were forbidden, and the temples of the divinities shut up. They fancied that, while this festival lasted, departed spirits suffered no pains in hell, but were permitted to wander about their graves, and feast upon the meats prepared for them.

FER DE FOURCHETT'E (an iron fork: *Fr.*), in Heraldry, a cross, having at each end a forked iron, like that formerly used by soldiers to rest their guns on.

FE'RIA (*Lat.*), a term applied, in the Roman Catholic breviary, to the several days of the week; thus, Monday is the *feria secunda*, Tuesday the *feria tertia*, and so on.

FE'RIÆ (*Lat.*), in Roman Antiquity, holidays, or days upon which no business was transacted. The *feriæ* were either *Publicæ* or *Privatæ*, the latter being observed only by families or individuals. The *Feriæ Publicæ* were divided into *Feriæ Stativæ*, or stated festivals; *Feriæ Conceptivæ*, or movable feasts; and *Feriæ Imperativæ*, or occasional festivals, enjoined by the consuls, or other magistrates, on some public occasion. The *Feriæ Latinæ*, kept on Mount Albanus by the thirty Latin towns, were *Feriæ Conceptivæ*, and were observed by the consuls before they set out for their provinces. The *Feriæ Nundinæ* were days in which the country people assembled, and exposed their commodities for sale—so called on account of being held every ninth day. They were, for a long time at least, *dies fasti*, or those on which business could be transacted, for the people only; but, for the patricians, they were *dies nefasti*, or holidays.

FERMENTA'TION (*fermento*, I ferment: *Lat.*), a peculiar change to which certain complex organic bodies are liable, under the influence of an external disturbing force. If to a solution of sugar there be added a little blood, flour, paste, or other putrescible azotised matter, fermentation will set in, and the sugar will be converted into alcohol, carbonic acid being at the same time disengaged. Nothing acts more powerfully as an exciter of fermentation than yeast—the matter thrown off by beer when fermenting. A certain amount of heat is required, and the presence of atmospheric air is necessary at the commencement. In making wine the vegetable albumen of the must absorbs oxygen from the atmosphere, and thus excites the action of fermentation in the sugar of the juice, which becomes changed into alcohol. In brewing, the liquor in which malted grain has been infused is caused to ferment by the addition of yeast, and this results in the conversion of the saccharine liquor into beer. In this case, however, the fermentation is not allowed to run its full course. The beer is drawn off into casks at a particular stage of the fermenting action, and a very slow fermentation afterwards goes on, which charges the liquor with carbonic acid. Fermentation is also made use of in preparing the weak spirit from grain, which is afterwards distilled into what, when rectified and flavoured, is called gin. The preceding are cases of *alcoholic* or *vinous* fermentation. *Acetous* fermentation takes place if weak alcohol be mixed with a little yeast, or other azotised organic matter, liable to putrefy, and be then exposed to the air. Oxygen is absorbed from the atmosphere, and the alcohol is converted into acetic acid or vinegar. Carbonic acid is not disengaged during this fermentation. Vinegar is usually made either from wine by spontaneous acidification, assisted by a temperature of about 80° F., or from a kind of beer prepared for the purpose.

FERNS (*fearn: Ang. Sax.*), the *filices* of botanists, an order of cryptogamic plants, of which examples occur in all parts of the world. The great majority have short stems, which creep upon or under the surface of the ground, but in some regions, such as New Zealand, a trunk rises to the height of several feet, rough with the stalks of withered fronds (leaves), and bearing green fronds at the summit, so as to resemble in some degree a small palm. The shapes of the fronds are very varied; some are entire, others much divided. The reproductive organs are borne on the back of the frond or at the margin, and consist of collections of spore cases containing spores, which are the true seeds, minute as dust. The spore cases are usually surrounded by an elastic ring, by the bursting of which, when ripe, the spores are thrown into the air. Ferns are of little use in any point of view, but for the sake of their elegant fronds they are much cultivated in greenhouses, and in those small glass cases called Wardian, after their inventor. From the neatness with which the dried fronds can be arranged upon paper, dried collections are common. In Great Britain, about 45 species have been found belonging to 19 genera. The world contains probably 3,000 species.

FER'RET (*furet: Fr.*), the *Putoris Furo* of naturalists, a blood-thirsty animal of the weasel tribe (*Mustelidæ*). It is a native of Africa, but has been domesticated with us for the purpose of killing rabbits and rats. It has white fur and red eyes

FER'RIC (*ferrum*, iron: *Lat.*), pertaining to or extracted from iron.— FERRIC ACID, an acid composed of one equivalent of iron united to three of oxygen.

FERRICAL'CITE (*ferrum*, iron; and *calx*, lime: *Lat.*), in Mineralogy, a species of calcareous earth or limestone, combined with a large amount of iron.

FER'RILITE (*ferrum*, iron: *Lat.*; and *lithos*, a stone: *Gr.*), in Mineralogy, a variety of *trap*, containing iron in the state of oxide.

FERROCY'ANIDE, in Chemistry, a compound of *ferrocyanogen* and a base.

FERROCYAN'OGEN, in Chemistry, a radical, consisting of one atom of iron and three cyanogen; known, in combination with two atoms of hydrogen, as *ferrocyanide of hydrogen*, or hydroferrocyanic acid; and with two atoms of potash, as *ferrocyanide of potassium*, or yellow prussiate of potash.

FERROSIL'ICATE, in Chemistry, a compound of ferrosilicic acid, with a base: a substance analagous to a salt.

FERROSILI'CIC, in Chemistry, a term designating a compound of iron and silex.

FERRU'GINOUS (*ferrugineus: Lat.*), of the colour of rust or oxide of iron.

FER'ULA (a rod: *Lat.*), in Ecclesiastical History, a place in which the *audientes* were kept. It was separated from the church, which such persons were not allowed to enter.——Under the Eastern empire, the *ferula* was the emperor's sceptre, as is seen on a variety of medals: it consisted of a long stem, or shank, and a flat square head.——FERULA, in Botany, a genus of umbelliferous plants, known as giant fennel. Asafœtida is the dried milky juice of several of the species.

FER'ULÆ (*Lat.*), in Surgery, splinters or chips of different matter, as of wood, bark, leather, paper, &c. The term is applied also to bones that have been disjointed, when they are set again.

FESCENNI'NE VER'SES (from *Fescennia*, a city of Etruria), among the Romans, a kind of extemporary dialogue, in which the performers, using a gross and rustic kind of raillery, reproached each other, as well as their audience, with their vices and foibles. Though they are said to have received their name from the town where this species of rude poetry was first used, it is not likely that they were peculiar to any one locality. Under cover of them much indecency prevailed, and the emperor Augustus prohibited them, as tending to corrupt the public morals.

FESSE (*fascia*, a wide belt: *Lat.*), in Heraldry, one of the nine honourable ordinaries, consisting of a line or belt drawn directly across the shield, from side to side, and containing the third part of it. When figures are contained within the breadth of the fesse, it is said to be charged, and they are said to be *in fesse*. When a fesse does not extend to the sides of the escutcheon, it is said to be *couped*. The diminutives of a fesse are the *bar*, the *closet*, and the *barulet*. A fesse, with a barulet on each side of it, is said to be *cotised*. A fesse removed to the top of the escutcheon is termed a *chief*, and is considered an honourable augmentation.——FESSE POINT, the exact centre of the escutcheon.——FESSEWAYS, or *in fesse*, denotes anything borne in the way of a *fesse*: that is, in a rank across the middle of the shield.——PARTE PER FESSE, a parting across the middle of the shield, from side to side, through the *fesse point*.

FES'TIVALS. [See FEASTS.]

FESTOO'N (*feston: Fr.*), in Architecture, Sculpture, &c., an ornament representing flowers, fruits, and leaves, gracefully intermixed or twisted together; suspended at the ends, and falling down in the form of an inverted arch.

FESTU'CA (a stem: *Lat.*), in Botany, a genus of perennial grasses, known as fescue grass.

FET'ICHISM or **FET'ICISM**, the worship of idols among the negroes of Africa, among whom *fetich* is a name by which an idol is designated. They believe that the household or family *fetich* narrowly inspects the conduct of every individual in the house, and rewards or punishes each according to his deserts.

FET'LOCK (for *foot-lock*), a tuft of hair that grows behind the pastern joint in the feet of many horses.

FEUD (*fehde: Ger.*), an inveterate quarrel between families, or parties in a state. The word is not applicable to wars between different nations

FEU'DAL SYS'TEM (*feodum*, a fief: *Mod Lat.*), a form of government anciently subsisting in Europe, and which was fully consolidated in the beginning of the 11th century. It forms the basis of many modern customs, and our law of real property was moulded with reference to it, and bears to this day the strongest marks of its origin. With respect to the origin of this system, it is probably to be found in the military customs of the Celtic or northern nations, known by the names of Goths, Vandals, Franks, Huns, and Lombards, who overran Europe on the declension of the Roman empire, and brought it with them from the countries out of which they emigrated: it was entirely unknown to the Romans. According to the feudal scheme, a victorious leader took possession of a country as supreme lord, and then allotted considerable portions of it, called *feoda*, *fiefs* or *feuds*, to his principal officers, who in their turn divided their possessions among their inferiors, and the condition upon which these rewards were given was that of faithful military service both at home and abroad. Their followers engaged themselves to this by an oath of fealty; and in the event of their not performing the service agreed upon, or deserting their lord in time of battle, &c., the lands were to return to their original possessor. Every person, therefore, who was a feudatory, i. e. who had received lands in this way, was bound to do everything in his power to defend the lord of his fee; while, on the other hand, the latter was not less subordinate to his immediate superior; and so on up to the prince himself. Thus the several orders of vassals formed a system of concentric circles, of which each was under the influence of the next; and all moved round a common centre, which was the king, the supreme feudal lord. As there was a graduated scale from the lowest vassal to the prince, or lord paramount of the territory, every man's interest was involved in the security of the whole; and every man was a pledge of security to his neighbour. In its vigour the feudal system constituted a regular, powerful, and compact system of government, and secured a unanimity which pervaded the various departments of the state; and while internally the power was diffused, it presented to foreign nations a united and formidable front. When the ideas which originate in the possession of property advanced, and the great grew more avaricious of money than of glory, and when, it ought perhaps to be added, a love of justice and order had become general, nothing was heard of but the enormities of the powerful, and the sufferings of the humbler classes; and the strength of feudal governments declined amidst a spirit of disaffection too universal to be checked. The ceremonies used in conferring a fief were principally three:—*homage*, with or without a feudal obligation, the latter only by great feudatories, such as those just mentioned; an oath of *fealty*; and *investiture*, or conveyance of the lands, either actual or symbolical. The division of ranks, under the feudal system, corresponded in theory, though not altogether in practice, with the territorial division of lands according to their tenures. Those who held by *knight's service* were the original nobility.

FEUIL'LANS, an order of bare-footed monks, who observe the same rule as the Bernardines. They derive their name from the abbey of *Feuillans*, five leagues from Toulouse, where the Bernardines were first reformed.

FE'VER (*febris*: *Lat.*), in Medicine, a disease characterized by an increase of heat, an accelerated pulse, great thirst, and an impaired state of several functions. It generally begins with languor of body and mind, chilliness amounting to shivering, though the skin often at the same time feels hot; the pulsation is quicker than it ought to be; respiration is hurried or laboured; there are pains in various parts of the body, particularly about the head, back, or loins; there is a loss of appetite, or nausea and vomiting; the mouth is dry; the bowels generally constipated; the urine small in quantity and deep in colour. The varieties of this disease are numerous; but the grand division is into *remittent* fevers, which subside or abate at intervals; *intermittent* fevers, which intermit or entirely cease at intervals; and *continued* fevers, which neither remit nor intermit.

FI'AT (let it be done: *Lat.*), in Law, a short order or warrant, signed by a judge, for making out and allowing certain processes.——In Bankruptcy, the order of the court by which a person is declared bankrupt.

FI'BRES (*fibra*: *Lat.*). A great number of plants afford fibres which are capable of being usefully employed by man, yet it is only a few of them that serve all the purposes required; and it is somewhat remarkable that, with the exception of jute, all the vegetable fibres used in the manufactures of Europe are derived from the plants, which, in the earliest ages, supplied the spindles and looms of Babylonia and Egypt. The chief fibres employed in textile manufactures are *Flax*, the produce of the stalks of *Linum usitatissimum*, a plant grown in nearly every part of the world: *Hemp*, the produce of the stalks of the *Cannabis sativa*, a plant allied to the nettles grown chiefly in Europe and Asia: *Jute* and *bast*, the inner bark of an Indian tree, *Corchorus capsularis*, allied to our lime tree: *New Zealand flax*, obtained from the leaves of a plant, *Phormium tenax*, belonging to the lily order: *Rhea fibre*, afforded by the stems of a plant, *Bœhmeria nivea*, or China grass, growing in India and China: *Sunn Hemp*, obtained from several leguminous plants: *Silk Cotton*, or Baraguda cotton, obtained from a large tree, the *Bombax ceiba*, growing in South America: *Pine apple fibre*, obtained from the leaves of pine apples and allied plants growing in tropical countries: *Manilla hemp*, or Abaca, obtained from the leaf stalks of a banana, *Musa textilis*, growing in the tropics: *Pita fibre*, afforded by the leaves of the American aloe, *Agave Americana*.

FIBRIL'LA (a *dim.* of *fibra*, a fibre: *Lat.*), in Botany, the branch or division of a radical fibre.— FIBRILLÆ, in Anatomy, small fibres

FI'BRINE (*fibra*, a fibre: *Lat.*), a substance found in solution in blood. When obtained clear of the other constituents, it forms long elastic filaments. More than half of dried fibrine consists of carbon, the other components being oxygen, nitrogen, and hydrogen, with a little sulphur and a trace of phosphorus: the proportions of these matters being nearly the same as in albumen With the exception of phosphorus, the fibrine of flesh has the same constituents, but in different proportions. When blood is drawn from the living animal the fibrine begins to coagulate.

FIB'ROLITE (*fibra*, a fibre: *Lat.*; and *lithos*, a stone: *Gr.*), a mineral that occurs associated with corundum; it is of a white or grey colour, and is composed of minute fibres.

FIB'ULA (a brace: *Lat.*), in Anatomy, the outer and smaller bone of the leg. It is nearly of a triangular figure, and stands parallel to, but distinct from, the *tibia*. Also a brooch, used both by men and women amongst the ancient Romans for the purpose of fastening their scarves or cloaks. It consisted of a pin and a curved portion.

FI'CUS (a fig: *Lat.*), in Botany, a large genus of plants, nat. ord. *Urticaceæ*, including the common fig (*F. carica*), the Banyan (*F. indica*), and the Pipul, or Sacred Fig of India (*F. religiosa*). Some yield caoutchouc of the finest quality: the *Ficus elastica* is particularly remarkable for it. Though the ordinary fig is so agreeable a fruit, the milky juice of the tree is acrid, and of the same nature, though less intense in its properties, as the *Ficus toxicaria*, *Demonum*, &c., which receive their names from their venomous qualities. 'The species of fig in hot countries,' says Dr. Lindley, 'often constitute vast forests, and have generally very thick trunks with extremely strong branches, and a prodigious crown. Travellers say that the colossal fig trees are among the most grateful presents of nature to hot countries; the shade of their magnificent head refreshing the traveller when he reposes under their incredibly wide spreading branches and dark shining foliage.'

FIEF (*Fr.*), a fee; an estate held of a superior on condition of military service. [See FEUDAL SYSTEM.]

FIELD, in Heraldry, the tincture, or combination of tinctures, which forms the ground of the escutcheon.——In Military tactics, the ground chosen for any battle.——In Painting, the ground or blank space on which anything may be drawn.

FIELD'FARE, the *Turdus pilaris*, a migratory bird of the thrush kind. It passes the summer in the northern parts of Europe, but visits Great Britain in winter.

FIELD-MAR'SHAL, the highest military rank in England.——FIELD-OFFICER, a military officer above the rank of a captain, as a major or colonel.——FIELD-COLOURS, in War, small flags about a foot and a half square, which are used by the quartermaster-general, for marking out the ground for the squadrons and battalions.——FIELD-PIECES, small cannons, from three to twelve-pounders, carried along with an army in the field.——FIELD-WORKS, in Fortification, those thrown up in besieging a fortress, or by the besieged to defend the place.

FI'ERI FA'CIAS (*quod fieri facias de bonis*, that you cause the sum or debt to be made from the goods: *Lat.*), in Law, a judicial writ, commanding the sheriff to levy the debt or damages on the goods of one against whom judgment has been had in an action of debt.

FIFTEEN'TH, an ancient tribute or tax laid upon cities, boroughs, &c., through all England, and so termed because it amounted to a fifteenth part of the sum at which each city or town had been valued; or it was a fifteenth of every man's personal estate, according to a reasonable estimate.——In Music, an interval of two octaves. Also, a stop on the organ, a double octave above the diapason.

FIG (*figue*: *Fr.*), the fruit of the fig-tree (*Ficus Carica*), formed of a fleshy hollow peduncle, which is covered inside with flowers that produce small one-seeded nuts. Figs are produced abundantly in Turkey, Greece, Italy, Spain, France, and northern Africa. They are of an oblong shape, and of a dark purple or greenish colour. When ripe, they are generally dried in ovens to preserve them, and are then packed very closely in the small chests and baskets in which we import them. Dried figs, with barley bread, are the ordinary food of the lower classes in Greece and the Archipelago.

FIG'URAL, or FIG'URATE NUM'BERS (*figura*, a figure: *Lat.*), such as do or may represent some geometrical figure, in relation to which they are always considered as *triangular* numbers, *pentagonal* numbers, *pyramidal* numbers, &c.

FIG'URATIVE (same *deriv.*), a term applied to whatever is expressed by obscure resemblances; as the types and mysteries of the Mosaic law. Also to any expression which is not taken in its primary and literal sense.

FIG'URE (*Fr.*, from same *deriv.*), in Astrology, a description of the disposition of the heavens at a certain hour, in which the places of the planets and stars are marked within a *figure* of twelve triangles, called houses.——FIGURE, in Geometry, a space bounded on all sides, either by lines or surfaces. Or the representation on paper, &c., of the object of a theorem or problem, to render its demonstration or solution more easy to be understood; in which sense it is a *diagram*.——FIGURE, in Fortification, the plan of any fortified place; or the interior polygon, which, when the sides and angles are equal, is called a *regular*, and, when unequal, an *irregular* figure.——FIGURE, in Rhetoric, a mode of speaking or writing, in which words are deflected from their ordinary signification, so as to express a passion with more emphasis and beauty than by the ordinary way. The principal figures of Rhetoric are the metaphor, allegory, simile, and personification; which, with their further divisions into hyperbole, climax, antithesis, &c., will be found under their respective heads.——FIGURE, in Painting and Designing, the representation of any animal, but more particularly of a human being.——FIGURES (inaccurately so called), in Arithmetic, certain characters by which we denote any number. They are more correctly termed digits.

FIL'ACER (*fil*, a thread or wire: *Fr.*), an officer of the Common Pleas and Queen's Bench, so called from his filing the writs on which he makes out processes.

FIL'AMENT (*filum*, a thread: *Lat.*), in Natural History, anything slender, like a thread; for example, the support of the anther in a flower.

FILA'RIA (same *deriv.*), a genus of entozoa, having long slender and filiform bodies. They infest even insects and their larvæ, as well as the larger animals. The species most dreaded by man is the *Filaria medinensis*, or Guinea-worm, which is endemic within the tropics of Asia and Africa, and entering beneath the skin, generally of the leg, sometimes produces the most excruciating pain. Its length varies from six inches to twelve feet, and its body, which is cylindrical, is nearly of a uniform size throughout.

FILE (*feile: Ger.*), in Mechanics, a well-known instrument formed of steel, which is cut in small furrows, and used in smoothing and polishing metals. Files are called by different names, according to their various degrees of fineness; and are also distinguished by their shape, as flat, half-round, three-square, four-square, and round.

FILE FISH, so called, either because of the skin being rough and cross hatched, like a file, or because the first spine on the back somewhat resembles a file. This spine, when erected, can be secured in that position by the second spine, which has a projection at its base, locking into a corresponding cavity at the base of the first. Until the hinder spine has been depressed, the first one cannot be brought down. Hence the fish is sometimes called the trigger-fish. This fish, which belongs to the genus *Balistes*, in the order of *Plectognathi*, is sometimes taken on the British coast, but more frequently in the Mediterranean.

FIL'ICES (ferns: *Lat.*). [See FERNS.]

FIL'IFORM (*filum*, a thread; and *forma*, a form: *Lat.*), having the form of a thread or filament; as, a filiform style or peduncle.

FIL'LET (*filet: Fr.*), in Architecture, a small square member, ornament, or moulding, used in various places, but generally as a corona over a moulding.——Among carpenters and joiners, a small piece, to which boards, joists, or quarters are nailed. ——In Heraldry, a kind of narrow bordure, which runs quite round, near the edge.

FIL'LIBEG, a dress reaching only to the knees, worn in the highlands of Scotland.

FIL'LIGREE-WORK (*filigrane: Fr.*; from *filum*, a thread; and *granum*, a grain: *Lat.*), a delicate and elaborate manufacture, primarily executed in threads of gold and silver, but lately imitated with coloured and gilt paper. In Sumatra, manufactures of filligree-work are carried to very great perfection. In China, where the filligree is chiefly of silver, many beautiful articles are produced. Malta has also a celebrity for articles of this kind.

FILTRA'TION (*filum*, a thread: *Lat.*—on account of the liquid passing off in a slender stream), the process by which a liquid is freed from solid bodies mixed with it, or from any impurities which it holds in suspension, by passing it through a linen or woollen bag, or filtering paper. Various other contrivances have also been invented for purifying muddy and putrid water, and rendering it fit for drinking; such as the use of a porous kind of stone, sand, charcoal, &c.; and numerous patents have been obtained for filtering apparatus, some of which are excellent.

FIM'BRIÆ (an extremity: *Lat.*), appendages disposed by way of fringe round the border of anything. Hence, *fimbriate* is a term used in Botany for fringed, or surrounded by hairs; and *fimbriated*, in Heraldry, is an epithet for an ordinary, with a narrow bordure or hem of another tincture.

FI'NAL CAU'SES (*finalis*, pertaining to the end; and *causa*, a cause: *Lat.*), the purposes or ultimate ends in view. The *efficient* cause is that which produces the event or effect; the *final* cause is that for which anything is done.

FINA'LE (*finalis*, pertaining to the end: *Lat.*), the concluding part of a musical composition. In instrumental pieces, it has most usually a character of vivacity, and requires a quick movement with lively performance.

FINAN'CES (*Fr.*), in Political Economy, the revenues of a state. The English system of finance rests on the produce of the various taxes which have been imposed at different periods, the aggregate amount of which, after deducting the expenses of collection, together with a few small items which cannot properly be called taxes, forms the whole of the public income. This income is annually appropriated to the several branches of the national expenditure: and when, in consequence of any extraordinary expenses, it is known that the income of the current year will be insufficient to meet all the demands upon it, it is usual to borrow the sum necessary to make up the deficiency, either from individuals or public bodies; and to allow a fixed rate of interest on the money thus obtained, till the principal is repaid, or till the period originally agreed upon has expired.——A person employed in the economical management and application of the public money is called a *financier*.

FINCH (*finke: Ger.*), in Ornithology, a numerous class of passerine birds, forming the family *Fringillidæ*, of which the most remarkable are the goldfinch, canary, and linnet.

FINE (*pœna*, a punishment: *Lat.*), in Law, a penalty or amends, made in money, for an offence; also money paid for the renewal of a lease.——There was formerly a mode of conveying land by fine and recovery; but it has been abolished. It was the termination of an imaginary action at law, and barred issue in tail immediately; but not those in remainder or reversion, except when the tenant had such reversion to himself. A *fine* also was the usual method formerly adopted for joining a feme covert in the sale, settlement, or incumbrance of an estate. [See ENTAIL.]

FINE ARTS, a term somewhat indefinite in its meaning, but generally applied to those arts which depend on the mind and imagination; opposed to the *mechanical*.

FI'NERY, the furnace in which metals are refined, i. e. hammered and fashioned into what is called a bloom, or square bar.

FIN'GER (*Ger.*, from *fangen*, to seize), in Anatomy, one of the extreme parts of the hand. The names of the fingers, reckoning from the thumb, are—1. *pollex*; 2. *index*; 3. *medius*; 4. *annularis*; 5. *auricularis*. In the thumb there are two, in each of the other fingers three, bones called phalanges, the upper of which are much larger than the lower.

FIN'GERING, in Music, the disposing

of the fingers in a convenient, natural, and suitable manner, in the performance of any instrument, but more especially of the organ and pianoforte.

FI'NITE (*finitus*, bounded; *Lat.*), in Mathematics, an epithet for a series, line, &c., which is limited in extent, duration, &c., in distinction from *infinite*.

FINS (*pinna: Lat.*), in Natural History, well-known parts of fishes, consisting of membranes supported by rays, which are either stiff spines, or flexible unjointed rays, or flexible jointed rays, the latter being frequently branched. The dorsal fins are those on the back. Some fishes have none there, others from one to four In the Salmon family, the second dorsal fin is rudimentary, and is termed *adipose*. The *pectoral* fins are two, one on each side, usually placed about the middle of the height of the fish, just behind the gill covers In some fishes they are absent The ventral fins are also two, usually placed close together under the pectoral fins, and then termed *thoracic*. If placed in front of the pectoral fins, they are termed *jugular*, and if on the belly, at some distance behind the pectoral fins, they are called *abdominal* When they are altogether absent, the fishes are said to be *apodal*, as in the case of the eel tribe. The *anal* fin is placed behind the vent: sometimes there are two, very rarely three The *caudal* fin is placed at the end of the tail. It varies much in shape, rounded, truncate, lunate, forked, &c The tail, with its fin, is the principal organ of locomotion, the other fins serving more to steer than to propel In works on ichthyology, a notation is employed, which briefly but clearly expresses their characters The fins in the perch are thus described — D 15, 1 + 13; P 14; V 1 + 5; A 2 + 8, C 17 which means that of D, the dorsal fins, the first has 15 rays, all spinous or bony; the second, 1 spinous, plus 13 that are soft, that P, pectoral fin, has 14 rays, all soft, V, the ventral fin, 1 spinous ray, plus 5 that are soft; C, the tail, or caudal fin, 17 rays In enumerating the rays of the caudal fin, only those which extend from the longest ray in the upper portion to the longest ray in the lower portion, both inclusive, are counted

FIN'TO (counterfeited: *Ital.*), in Music, a feint, or an attempt to do something without doing it. Thus, in a *cadenza finta*, when everything proper for a true cadence has been done, instead of falling on the right final, a higher or a lower note is taken

FIR'-TREE (*furh Sax.*), the name of several species of the genus *Pinus*· as the Scotch fir, the silver fir, spruce fir, &c. [See PINE]

FIRE (*feuer: Ger.*). In former times, fire obtained a place among the elements. It is now known that what is ordinarily called by that name is merely solid or gaseous matter at a high temperature. [See CALORIC and HEAT]——*Subterranean fires.* The high temperature of thermal springs, the effects produced formerly by extinct volcanoes, and at present by those still in activity, with the fact that the earth becomes warmer the deeper we descend, have induced philosophers to adopt the idea of a central fire. This supposes that the globe was once in a state of igneous fusion; that the surface has gradually become solid by cooling; and that the interior of the earth is still liquid and hot, and may remain so for an indefinite period, during which the lost by radiation will become gradually more slow. [See EARTH, VOLCANO, &c.]

FI'RE-ARMS, a general designation for all sorts of guns, fowling-pieces, blunderbusses, pistols, &c., which produce their effect by the combustion of gunpowder. The manufacture of these weapons in England is very extensive; and in order to prevent the numerous accidents which would otherwise occur from the bursting of ill-constructed barrels, the Act 55 Geo. III, c 59, imposes a fine of 20*l.* on any person using, in any of the progressive stages of its manufacture, a barrel not duly proved, on any person delivering the same, except through a proof-house; and on any person receiving, for the purpose of making guns, &c, any barrels which have not passed through a proof-house.

FI'RE-BALLS, in Military operations, balls which are capable of being ignited: such, for instance, as are thrown by night from mortars or howitzers towards quarters which it is desirable to examine.——In Natural Philosophy, globular masses of fire, of different magnitudes, occasionally seen moving through the atmosphere with greater or less velocity. With regard to the nature of these phenomena, there are various conjectures. [See FALLING STARS, METEORS, &c.]

FI'RE-DAMP [See DAMPS]

FI'RE-DRESS, an invention of the Chevalier Aldini, consisting of an exterior light armour of metallic gauze, which was discovered by Sir Humphry Davy to be impervious to flame, and of an inner covering of a material which is a slow conductor of heat Among flexible fibrous substances capable of being spun and woven into tissues, the asbestos possesses preeminently the property of slowly conducting heat; but wool, cotton, &c., if immersed in certain saline solutions, prevent the transmission of injurious heat to the body, during an exposure of some minutes to the action of flame on the outward covering of wire gauze

FI'RE-ENGINE, an engine for extinguishing fire It consists of two forcing pumps, so combined that their joint action produces a constant and powerful stream of water, which, by means of a pipe, may be directed at pleasure to any point. The handles are so disposed, that, while the piston of one pump is up, that of the other is down; and they are elongated for the purpose of enabling a great number of men to work them at the same time.——By an ingenious application of steam power to the working of fire-engines, their usefulness has been greatly increased. As soon as an alarm is given, the fire is kindled, and the bellows attached to the engine are worked by hand. By the time the horses are harnessed, the fuel is thoroughly ignited, and the bellows are then worked by the motion of the wheels; so that generally, by the time the engine reaches the fire, the steam is ready. One of the ordinary construction will work in eighteen minutes after the fire is lighted, and will deliver about 9000 gallons an hour to a height of 90 feet, through an orifice of 7-8ths of an inch. Some of the insurance companies in London have floating fire-engines on the Thames, which are extremely serviceable in case of fire among the shipping, or buildings near the river.

FI'RE-ESCAPE, any machine or apparatus for enabling persons to escape from buildings on fire. Sometimes the object is effected with, and sometimes without, external aid. In the first case, a very portable kind of ladder, or a contrivance for raising by a rope and pulley a basket or other means of lowering persons to the ground, is generally used. In the second there is usually a rope ladder, or a long cord, with something like a seat, and so arranged that a person may lower himself.

FI'RE-FLY. Several flying insects give out light in tropical countries. Most of these are beetles, belonging to the order of *Elateridæ*. One of the most brilliant is the *Pyrophorus noctilucus*, an inhabitant of South America. Two or three of these, placed under a glass, will give out light sufficient for the reading of a book.

FI'RE-SHIP, a vessel filled with combustibles, and fitted with grappling irons, which, with the advantage of a favourable wind, hook on to the enemy's vessels, and set them on fire.

FI'REWORKS, compositions of sulphur, saltpetre, charcoal, and other ingredients, which produce a brilliant effect when ignited. [See PYROTECHNY.]

FI'RING-IRON, in Farriery, an instrument not unlike the blade of a knife; which, being made red-hot, is applied to a horse's hams, or other places, where there are morbid swellings, farcy knots, &c., in order to dissipate them.

FIR'KIN, an English measure of capacity, containing nine ale gallons, or seven and a half imperial gallons.

FIR'MAMENT (*firmamentum: Lat.*), in Scripture, denotes the great arch or expanse over our heads, in which are placed the atmosphere and the clouds, and in which the stars *appear* to be. Its name is due to the supposition that it was a transparent solid, in which the heavenly bodies were fixed.——In the Ptolemaic astronomy, the firmament is the eighth heaven or sphere, with respect to the seven spheres of the planets which it surrounds. It was supposed to have two motions—a diurnal, given to it by the *primum mobile*, from east to west about the poles of the ecliptic; and another opposite motion from west to east. There is a revolution in this direction, which, according to Tycho Brahe, is completed in 25,412 years; according to Ptolemy, in 36,000; and according to Copernicus, in 25,800; in which time the fixed stars would return to the same points in which they were at the beginning. This period is commonly called the Platonic, or great year.

FIR'MAN, or more properly **FER'MAN** (a command: *Pers.*), a mandate or certificate of the sovereign, in Turkey, Persia, &c., for various purposes, but best known to Europeans as a passport for travellers.

FIRST-FRUITS, offerings made to God by the Jews, of part of the fruit of their harvest, as an acknowledgment of his sovereign dominion. They were called first-fruits because they were offered in the temple before any part of the crop was touched.——FIRST-FRUITS, in the church of England, are the profits of every spiritual benefice for the first year. Before the Reformation, they were given to the pope, but since to the sovereign. The valuation is that made by Henry VIII. The first-fruits and tenths of all livings over 50*l.* were transferred, in the reign of Queen Anne, to a fund called *Queen Anne's bounty*, for the increase of smaller benefices, which are freed from any kind of payment.

FISC or **FIS'CUS** (a basket used by private persons for carrying money: *Lat.*), in Roman Antiquity, the treasury of a prince or state. It differs from the *ærarium*, which was the treasury of the public: thus, when the money arising from the sale of condemned persons' goods was appropriated to the use of the public, their goods were said to be *publicati*; but when it was destined for the support of the prince, *confiscati*. The *fiscus* did not exist until the time of the emperors; and as soon as they obtained possession of everything, the distinction between *fiscus* and *ærarium* was no longer observed. [See ÆRARIUM.]

FIS'CAL (from last), in the Civil Law, relating to the pecuniary interest of the prince or people. The officers appointed for the management of the fisc were called *procuratores fisci* and *advocati fisci*.

FISH (*Ger.*). [See PISCES.]——FISH, in Architecture, a piece of wood fastened to another to strengthen it.——FISHES, in Heraldry, are the emblems of silence and watchfulness, and are borne upright, imbowed, extended, endorsed, &c.

FISH'ERIES (*fischerey: Ger.*), places where fish are caught in great abundance, so as to constitute an important article in commerce. The principal fisheries for salmon, herrings, mackerel, pilchards, &c., are along the coasts of England, Scotland, and Ireland; for cod, on the banks of Newfoundland, Nova Scotia, and Labrador, as also on the coasts of Holland; and for whales, in those seas which wash the shores of Greenland, and also in various parts within the tropics.——*Anchovies* are fished for on the coast of Provence, in the months of May, June, and July, at which season shoals of this fish regularly come into the Mediterranean through the Straits of Gibraltar. They are likewise found in plenty in the river of Genoa, on the coast of Sicily, and on that of the island of Gorgona, opposite to Leghorn; those obtained at the latter place are reckoned the best. Anchovies are seldom fished for but in the night-time; for if a fire is kindled on the poops of the vessels, the anchovies come in greater numbers into the nets. About 120,000 lbs. weight of them are annually consumed in Great Britain.——

The *Cod fishery* is most important. It is carried on at the banks of Newfoundland and the neighbouring coasts. The cod are usually taken by line, nets being but rarely employed; and as they bite with great voracity, almost anything serves for bait. The number of vessels engaged in the North American *cod fishery*, including the British, American, French, Dutch, and Spanish, is calculated to amount to 6,000 or 7,000, which take about 40,000,000 fish annually.——The *Herring fishery* was at first engrossed almost entirely by the Dutch; but in 1749, parliament, to encourage it, granted a tonnage bounty on vessels employed in it. This had not, however, the desired effect, and was withdrawn. The most important seats of the fishery are on the coast of Scotland So long ago as 1834, 11,000 boats and 82,000 persons were employed in it. Herrings are remarkable for their immense numbers; they move in shoals, sometimes occupying many miles in extent, and several fathoms in depth Their presence is easily discovered, during the day, by the great numbers of birds which accompany them, and by the unctuous matter with which the water is covered; and in the night, by the brilliant phosphoric light which they emit. They are taken generally by night in nets, which are sometimes of enormous extent, and are dragged by a capstan Herrings are very plentiful about the Orcades in June and July; in the German Ocean in September and October; and in the English Channel in October, November, and December. ——*Mackerel* are found in large shoals in the ocean, but especially on the French and English coasts. They enter the English Channel in April; and proceeding as the summer advances, about June they are on the coasts of Cornwall, Sussex, Normandy, Picardy, &c, where the fishery is most considerable They are taken either with a line or nets, the latter being preferable; and most usually in the night-time. They are eaten fresh, and are also pickled in salt or brine.——The *Salmon* fishery in these countries has greatly diminished of late. It is carried on chiefly in the rivers, and sea-coasts adjoining to the river mouths Those rivers most distinguished for salmon in Scotland, are the Tweed, the Clyde, the Tay, the Dee, the Don, the Spey, the Ness, the Bewly, &c., in most of which it is very common, about the height of summer, especially if the weather happen to be very hot, to catch four or five score of salmon at a draught. The chief rivers in England for salmon are the Tyne, the Trent, the Severn, and the Thames. The fishing usually begins about January; and ceases in Scotland about the 15th of August, because, as it is then supposed, the fish come up to spawn. ——The principal *Sturgeon fishery* is in the mouth of the Volga, on the Caspian Sea, where the Russians employ a great number of hands.——The *Northern Whale fishery*, on the coast of Greenland, begins in May, and continues till the end of July.——The *Southern Whale fishery* consists of three distinct branches: 1st, that of the *spermaceti whale*, which is found in all tropical climates, but especially on the coasts of New Zealand and Japan: the ordinary duration of the voyage of a ship from England, employed in this department of the fishery, is about three years. 2nd, that of the common *black whale* of the southern seas, met with principally on the coast of Brazil. And, 3rd, that of the *sea-elephant*, or southern walrus, met with in the seas near California and the islands of Desolation, South Georgia, &c. Vast numbers of these animals are annually captured, and they furnish an abundance of oil——It appears that, while our northern whale fishery has long been declining, the American southern whale fishery has risen into great importance. It is, however, very generally believed that in the south, as well as in the north, there is a very perceptible decrease in the supply of fish, and that the whale fisheries have consequently passed their zenith——Besides the before-mentioned fisheries, there are several others, both on the coasts of Great Britain and in the North Seas, which, although not much the subject of merchandise, employ great numbers of persons; as, the *oyster* fishing at Colchester, Feversham, the Isle of Wight, in the Swales of the Medway, &c; and the *lobster* fishing in the British Channel, the Firth of Forth, on the coast of Northumberland, the coast of Norway, &c, &c.

FISH'ING (*fischen*, to fish: *Ger.*), the art of catching fish, whether by means of nets, or of spears, lines, rods, and hooks. By several statutes it is provided, that no person shall fish in any pond or moat without the owner's consent, on pain of three months' imprisonment; and if any one take fish in a river without a licence obtained from the proprietor, he shall forfeit 10s. to the poor, and triple damages to the party aggrieved

FISH'ING FROG, or ANGLER, the *Lophius piscatorius* of icthyologists, called also the toad-fish and sea devil It is the most ill-shaped of fishes, resembling the tadpole of the frog. The head is larger, circumferentially, than the whole body; the mouth is nearly as wide as the head, and the lower jaw is much longer than the upper, and bearded all round the edge, both jaws being armed with numerous teeth; while it lies hid in mud, which it stirs up to render the water turbid. Upon the snout and head are two or three flexible spines covered with skin, one of which has a fleshy tag at the end. It is said that this acts as a bait and brings small fish within reach of the unwieldy Lophius. The common angler is from three to six feet long.

FIS'SILE (*fissilis*: *Lat.*), an epithet often used in Mineralogy, &c., for that which may be cleft or divided in the direction of the grain, natural joints, or laminæ.

FIS'SIPED (*fissus*, cleft; and *pes*, a foot: *Lat.*), in Zoology, an epithet for an animal whose toes are separate or not connected by a membrane.

FIS'SURE (*fissura*: *Lat.*), a narrow chasm made by the parting of any substance.——In Surgery, a crack or slit in a bone, either transversely or longitudinally.

FIS'TULA (a pipe: *Lat.*), in Surgery, a long sinuous ulcer, communicating with a larger cavity, and having a small external opening.——FISTULA LACHRYMALIS, a disease which attacks the great caruncle in the inner corner of the eye; a disorder accompanied with a flowing of tears. ——FISTULA, an ancient musical instrument resembling our common flute or flageolet.

FIS'TULAR (same *deriv.*), among botanists, an epithet applied to leaves and flowers that are tubular, or resemble a hollow pipe.

FISTU'LIFORM (*fistula*, a pipe; and *forma*, a form: *Lat.*), in Mineralogy, an epithet for such substances as are in round hollow columns.

FIT (a corruption of *fight*, because every fit of sickness is a struggle for life), a sudden and violent attack of disorder, in which the body is often convulsed, and sometimes senseless: as, a *fit* of apoplexy or epilepsy, &c. We also apply the word to the first attack or the return of certain diseases; as, a *fit* of the gout, &c.——FIT, or FYTTE, an old word for a division of a lyric poem or ballad.

FITCH'ET (*fissau: Fr.*), an animal of the weasel kind: the polecat.

FIXED AIR, the name formerly given by chemists to the air which was liberated from certain compounds of lime, magnesia, and alkalis: it is now commonly called *carbonic acid gas*, which see.

FIXED OILS, in Chemistry, such oils as bear a high temperature before they give off vapour, in distinction from volatile or essential oils.

FIXED STARS, in Astronomy, the stars that are exterior to our solar system. The great majority of such stars retain the same apparent position and distance with respect to each other; and are thus distinguished from planets and comets, which are moving bodies.

FLAG, a general name for colours, standards, banners, ensigns, &c.——*To strike or lower the flag* is to pull it down in token of respect or submission.——*To strike the flag*, in an engagement, is the sign of surrendering.——*To hang out the white flag* is to ask quarter; in some cases, it denotes that the vessel has no hostile intention, but comes to trade, &c. The *red* flag is a sign of defiance and battle.——*To hang the flag half-mast high* is a token or signal of mourning.——The chief naval flags are: the royal standard; the admiralty flag, an anchor on a red ground; and the union or jack, in which are blended together the crosses of St. George, St. Andrew, and St. Patrick; it is carried by the admiral of the fleet.——FLAG, a name applied to several plants with bladed leaves. There is the common flag, or water iris, that grows in rivers, and bears a yellow flower, the *Iris pseudacorus* of botanists. The *corn-flag* is a species of gladiolus. The *sweet-flag*, *Acorus calamus*, a plant that has an aromatic odour with an acid taste, and is used as a stimulant and tonic.

FLAG'-OFFICERS, those who command the several squadrons of a fleet; as, admirals, vice-admirals, and rear-admirals. [See ADMIRAL.]

FLAG'-SHIP, a ship which has on board an officer, who has a right to carry a flag, in distinction from the other vessels under his command.

FLA'GELLANTS (*flagellans*, scourging: *Lat.*), in Church History, a fanatical sect in the 13th century, who maintained that remission of sins was not to be obtained without flagellation. Accordingly, they walked in procession, preceded by priests carrying the cross, and publicly lashed themselves till the blood ran down their naked bodies. They were joined by nobles, ecclesiastics, nuns, and children, and their pilgrimages extended throughout all the provinces of southern Germany, and even farther. They were dressed in sombre garments, with red crosses on the breast, back, and cap, and they carried triple scourges, tied in three or four knots, in which points of iron were fixed. Even by night and in the severest winter they traversed the cities in thousands with burning torches and banners, chanting penitential hymns.

FLAME (*flamma: Lat.*), a gaseous or vaporous body in a state of intense ignition. When the vapour or gas is intimately mixed with a supporter of combustion, such as oxygen, the ignition is so sudden and so general, on the application of heat, as to be what is termed an *explosion*. Unless the supporter is thrown into the interior of the flame, as with the blow-pipe, the combustion is on the exterior of the flame only; and the flame is more elongated, and the ignition and light less intense, in proportion as the inflammable gases come more slowly into contact with the requisite quantity of supporter. Every one must have remarked that the flame of a lamp immediately contracts, and the light becomes more brilliant, the instant a glass chimney, which increases the current of air, and therefore the supply to the flame, is placed over the burner. A flame is gas or vapour at a white heat; anything, therefore, that lowers its temperature, destroys the flame. If a wire gauze is placed over a flame, the latter cannot pass through the meshes; for the vapour or gas, in passing them, is so cooled down as to be no longer flame. This is the principle on which Davy's safety-lamp for miners is covered with wire gauze. No temperature less than that of flame will explode mixed gases in the mine; and that temperature is lost in passing from the interior of the lamp through the gauze.

FLA'MEN (*Lat.*), in Roman Antiquity, the name of an order of priests, said to have been instituted by Romulus or Numa. Originally there were three priests so called: the *Flamen Dialis*, consecrated to Jupiter; *Flamen Martialis*, sacred to Mars; and *Flamen Quirinalis*, who superintended the rites of Quirinus or Romulus. But the number was afterwards increased with the introduction of new gods and the worship paid to deceased emperors.

FLAMIN'GO (*flamma*, a flame: *Lat.*), the popular name of a genus of long-legged, web-footed birds (*Phœnicopterus*), with scarlet plumage, of which one species, *P ruber*, haunts the shores of the Mediterranean. Two other species are natives of South America. They feed on worms, shell-fish, &c.

FLANK (*flanc : Fr*), the side of an army, or a battalion encamped on the right or left.——In Fortification, that part of a bastion which reaches from the curtain to the face; or any part of a work that defends another work along the outside of its parapet.

FLAT, in Music, a character which lowers a note one semitone.

FLAT'TING, in gilding, the giving a light touch to the work in the places not burnished; it is done with a pencil dipped in size, in which a little vermilion is sometimes mixed.

FLAT'ULENCE (*flatus*, a blast of air: *Lat*), in Medicine, air generated in a weak stomach and intestines by imperfect digestion, occasioning distension, uneasiness, and frequent eructations.

FLAX (*flex: Sax.*), the fibre obtained from the stalks of the *Linum usitatissimum*, an annual plant with a blue flower, which is extensively cultivated throughout Europe and in other parts of the world. The most suitable soil is a light dry loam, with a moderately tenacious subsoil. The plants are pulled by hand, and are then placed in water until a certain amount of putrefaction has ensued. This is called *retting* The fibre is then easily separated from the soft non-fibrous portion of the straw by the process called *scutching*, which is done by machinery. After scutching the fibre is *hackled*, that is, it is repeatedly drawn through sets of iron teeth, by which the broken pieces are combed out, and the fibres are arranged parallel-wise. It is then ready for the spinner. The aggregate value of goods annually manufactured from flax in the United Kingdom is upwards of 15 millions sterling; and nearly a million persons are employed in the manufacture.

FLEA (*Sax.*), an insect of the genus *Pulex*, a member of the order *Aphaniptera*. The species undergo complete metamorphosis, that is, they are grubs and pupas before they are perfect insects. The muscular power of the flea is truly wonderful. It has been known to draw 70 or 80 times its own weight: it resists the ordinary pressure of the fingers in our endeavours to crush it, and leaps two hundred times its own length. Hence it is called by the Arabians 'the father of leapers.' Supposing the same relative force to be imparted to the body of a man six feet high, he would be enabled to leap three times the height of St. Paul's! Latreille tells us of a flea which dragged a silver cannon 24 times its own weight, mounted on wheels; and was not alarmed when this was charged with gunpowder and fired.

FLEAM (*flamme : Fr.*), an instrument for bleeding cattle: it is a small blade, which is projected from a sheath by a spring.

FLEECE (*fliess : Ger.*), a flock of wool, or what comes from a sheep at one shearing. ——ORDER OF THE GOLDEN FLEECE, an order of knighthood instituted by Philip III., duke of Burgundy, in 1430.

FLEET (*flota*, a company of ships : *Sax.*), a squadron of ships, either of war or commerce.——FLEET (*fleoh*, a place where the tide comes up . *Sax.*) was also the name of a prison in London, where debtors were confined, and to which persons were committed by the courts of Chancery and Common Pleas. It was situated in Farringdon Street, and derived its name from a stream which formerly ran near the building, and was called the Fleet In time it became little more than a sewer, and, being offensive, was covered over

FLESH (*fleisch: Ger.*), in Anatomy, the muscular part of an animal body, in which the blood-vessels are so small as to retain only blood enough to give them a red colour.——FLESH, in Botany, the pulpy substance of any fruit or root

FLEUR-DE-LIS, in Heraldry, a charge supposed to represent an iris; or, as some have supposed, the head of a javelin. It was borne from an early period in the arms of France

FLEX'OR (*flecto*, I bend · *Lat*), in Anatomy, a name applied to several muscles, whose office it is to bend the parts to which they belong: they are opposed to the *extensors*, which open or stretch these parts.

FLEX'URE (*flexura*, a bending . *Lat.*), in Geometry, the bending or curving of a line or figure The *point of contrary flexure* is that point in a curve at which the curvature passes from convex to concave, or *vice versâ*

FLINT (*Sax*), a semi-pellucid stone, consisting of nearly pure silex It is a subspecies of quartz, of different shades of colour. Flints occur almost always in nodules or tubercular concretions of various and very irregular forms. They are formed in regular layers in chalk strata How they came to be so deposited is a question geologists have not yet solved They break with an even, glossy surface, are moderately transparent, very hard, and capable of a fine polish; readily strike fire with steel; and burn to whiteness They are employed in the manufacture of glass and pottery ware

FLINT GLASS, or CRYSTAL. It derives its name from flint, because that substance was formerly employed in its manufacture. It is important to the maker of optical instruments, as it possesses the property of causing a greater dispersion of the rays of light, passing through a prism or lens formed of it, than any other vitreous substance—which is due to the lead it contains. Hence its use in the manufacture of achromatic lenses. [See ACHROMATISM.] But then there is great difficulty in obtaining large pieces of flint-glass quite free from streaks.

FLOAT (*flott*, a float: *Ger.*), a raft, or number of pieces of timber fastened together and floated down a river with the tide.

FLOAT'ING (same *deriv.*), THE ART OF. Persons have sometimes been saved from drowning by remembering that the human body is specifically lighter than water, and will float on it, particularly if the lungs are well inflated and it is kept quiet. But it must lie along the water on the back, or the mouth will not be above the surface.——

Floating Battery, a vessel used as a battery to cover troops landing on an enemy's coast.——**Floating Breakwater**, a marine contrivance, consisting of a series of square frames of timber, connected by mooring chains or cables, and intended to break the violence of the agitated waves: vessels may ride within these quadrangular basins with more safety; and they produce smooth water in bathing-places, on a rough coast.——**Floating Bridge**, in War, a kind of double bridge, the upper part of which projects beyond the lower. It is capable of being moved forward by pulleys, and is used for carrying troops over narrow moats in attacking the outworks of a fort. Floating bridges, in the form of ferry-boats of a very large size have of late been constructed for the transit of passengers and goods across creeks, harbours, &c., by the application of steam-power.——**Floating Light**, on shipboard, a hollow vessel of tinned iron-plate, with a lantern. It is used for the purpose of saving those who may have the misfortune to fall overboard in the night.——**Float-boards**, those boards fixed to water-wheels or under-shot mills, serving to receive the impulse of the stream, by which the wheel is carried round.

FLOETZ, or **FLETZ** (*flötz*, a layer: *Ger.*), in Geology, a term formerly employed by Werner and other German geologists, to signify what are now known as secondary rocks.

FLOOD'-GATE (*fluth*, a flood: *Ger.*), a sluice or gate that may be opened or shut, for the admission or exclusion of the water.

FLOOD'-MARK, the mark which the sea makes on the shore at the highest tide: high-water mark.

FLO'RA (the goddess of flowers: *Lat.*), the term used to designate the plants which are indigenous in a country, as we say, the Flora of Great Britain, meaning the wild plants of the country.

FLOR'ID STYLE (*floridus*, flowery: *Lat.*), in Literary Composition, that which is much enriched with figures and flowers of rhetoric. Longinus uses the terms *florid* and *affected style* indifferently, and describes them as quite contrary to the true sublime.

FLOR'IN (*Fr.*, from *Florence*, in Italy, where it was first coined), a coin of different values; the silver florin of Austria is worth about 2*s.* 1*d.* The two shilling piece of the United Kingdom is called a florin.

FLOS (a flower: *Lat.*), in Botany, the name of several species of plants. Also a general name for the flower.

FLOS'CULE (*flosculus*, a little flower: *Lat.*), in Botany, a floret of a compound flower.

FLOS'CULOUS (same *deriv.*), in Botany, an appellation sometimes given to compound flowers, made up of a number of florets enclosed in the same common cup.

FLOSS SILK, the name given to the portions of ravelled silk broken off in the filature of the cocoons. It is carded like cotton or wool, and spun into a soft coarse yarn or thread, for making shawls, socks, and other articles where an inferior kind of silk may be used.

FLOT'SAM, in Law, a term for goods lost by shipwreck, but which are floating on the sea. There are two other uncouth terms made use of to describe wrecked goods, viz. *jetsam* and *ligan*: the former is used when the goods are sunk; and the latter also when they are sunk, but are tied to a cork or buoy, that they may be found again.

FLOUR'ISH (*floresco*, I flourish: *Lat.*—used metaphorically), in Music, a prelude or preparatory air, which does not follow any settled rule. Also the notes which a singer or instrumental performer occasionally introduces.——In Military language, the sounding of trumpets, on receiving an officer or other person of distinction.

FLOW'ER (*fleur*: *Fr.*), that part of a plant which contains the organs of fructification. The parts are arranged in whorls. In a complete flower the outer one consists of the calyx formed of one or more leaves, termed sepals; the next is the corolla composed of one or more petals; the third whorl is formed by the stamens, and the innermost of the pistils. Sometimes there is only one whorl of floral leaves, and then the flower is said to be *monochlamydeous*, if neither whorl is present it is termed *achlamydeous*. If both calyx and corolla are present, but so blended together that they are not easily distinguished, the floral envelope is termed a *perianth*.

FLOW'ERS, in Chemistry, a term formerly applied to a variety of substances procured by sublimation; as flowers of sulphur, &c.

FLOW'ERS, ARTIFI'CIAL, a considerable article of manufacture, particularly in France. The savages of South America manufacture, with feathers derived from the brilliant plumage of their birds, flowers which closely resemble the products of vegetation.

FLU'ATES, in Chemistry, salts which are more correctly termed *Fluorides*, and consist of fluorine combined with a metal, &c.

FLU'ID (*fluo*, I flow: *Lat.*). From the facility with which the particles of fluids move among each other, the pressure exerted by a given particle, which depends on the specific gravity of the fluid and the height of the column above, is equal in every direction. The pressure of a fluid on any surface is equal to the surface multiplied by the depth of its centre of gravity below the surface of the fluid. Fluids are divided into elastic and non-elastic: these are, however, relative terms, all fluids being more or less elastic. That which is termed an *elastic* fluid, is in the form of an air or vapour: it is *permanently* elastic, if it retains its aeriform nature at the ordinary temperature of the atmosphere; but *non-permanently* elastic, if, like steam, it becomes a liquid in the same circumstances. The elasticity of non-elastic fluids is so trifling that for a long time it was not certain that they had any. Whether a given body shall be a solid, liquid, or gas, depends on heat, or heat and pressure.

FLUKE, the common name of a species of Distoma (a genus of intestinal worms), which infests the liver of sheep, and produces the disease called *rot*. Other species are found in the alimentary canal, or other internal parts of other mammals, and of birds and fishes. These animals, some of which are very small, have soft bodies with two suckers by which they adhere. One of the suckers surrounds the mouth. All are destitute of eyes and other organs of special sense.

FLUOR'IC A'CID. [See Hydrofluoric Acid.]

FLU'ORINE, in Chemistry, an element presumed to be gaseous, which, when combined with hydrogen in the proportion of nineteen parts to one of the latter, forms hydrofluoric acid. It has never been obtained isolated, in consequence of its energetic action on the metals, and especially silicium, a component of glass.

FLU'OR SPAR, in Mineralogy, the fluate of lime; a mineral which abounds in nature, and consists of calcium in combination with fluorine. Though sometimes massive, it is almost always regularly crystallized. The variously coloured specimens called *Derbyshire spar* are, by means of the turning-lathe, formed into vases and other ornaments.

FLUOSILIC'ATE, in Chemistry, a compound containing fluosilicic acid.

FLUOSILIC'IC ACID, in Chemistry, an acid consisting of fluorine and silicon.

FLUSH, in Carpentry, a term signifying that two bodies joined together make an even surface.

FLUTE (*flûte: Fr.*), *the common or English*, a musical wind instrument, consisting of a tube of wood about eighteen inches in length, furnished with holes at the side, for the purpose of varying its sounds, by stopping and opening them with the fingers. The *German flute*, unlike that just mentioned, is blown by a hole at the *side:* besides the other holes at the side, intended to be stopped by the fingers, it has brass or silver keys, to produce the various flats and sharps, &c.

FLUTES or FLU'TINGS (same *deriv.*), in Architecture, perpendicular channels cut along the shaft of a column or pilaster. They are scarcely ever used in the Tuscan order: their section is circular, segmental, or elliptical. The Doric column has twenty round its shaft: columns of the other orders, twenty-four. The flutings of columns are sometimes *cabled*—that is, have their lower parts partly filled up with cylindrical pieces, like a cable.

FLUX (*fluxus*, a flowing; *Lat.*), in Chemistry, a general term to denote any substance or mixture added to assist in the fusion of minerals. The fluxes made use of in experiments consist usually of alkalis, which render earthy mixtures fusible, by converting them into glass. When tartar is deflagrated with half its weight of nitre, a mixture of charcoal and carbonate of potash remains, which is called *black flux*. When an equal weight of nitre is used, the entire charcoal is burned off, and *white flux* remains. Limestone, fluor spar, borax, and several earthy or metallic oxides, are employed as fluxes in metallurgy.——Flux, in Medicine, an extraordinary issue, or evacuation of some humours of the body.——Flux and Reflux, the regular and periodical motion of the sea, which happens twice in 24 hours 48 minutes. By the flux or advancing motion of the tide, the water rises; by the reflux, or ebbing of the tide, it sinks.

FLUX'IONS (*fluxio*, a flowing: *Lat.*), a method of algebraic calculation invented by Sir Isaac Newton. In this branch of mathematics, magnitudes of every kind are supposed to be generated by motion. The method is the same as that of limits complicated with the idea of motion. By a comparison derived from mechanics, it represents the method of prime and ultimate ratios. This method has been abandoned by mathematicians for Leibnitz's invention, the Differential Calculus, because it was found weak in resources and embarrassing in operation.

FLY, the popular name of many species of winged insects chiefly belonging to the vast order Diptera. The common blue-bottle fly, *Musca vomitoria*, and the common house fly, *Musca domestica*, are amongst the best known species.——Fly, in Mechanics, a heavy wheel or other body, intended to regulate the velocity of a machine, or to accumulate power. Its efficiency as a regulator arises from the comparatively large number of its particles, which require a vast increase or diminution of motion, in order that the velocity of the whole mass may be *sensibly* changed. It absorbs motion when there is too much, and gives it out when there is too little. In this way it is used as a regulator of the steam-engine. It serves as a means of accumulating force; and suddenly giving out the force which it received gradually, it enables a power, in coining, &c., to produce a far greater effect than would be possible without such a contrivance. Its shape is of little consequence, only so far as that the less it is resisted by the air the better; but the farther the mass from the centre of motion, that is, the greater the circle it describes, the more effective it is. A fly is generally in the shape of a wheel, or of a rod with a heavy ball of metal at each extremity.——Fly, among mariners, that part of a compass on which the thirty-two points are described.

FLY'-BLOW, the deposit of eggs by flies, which afterwards become larvæ or maggots, and ultimately flies.

FLY'-CATCHER, the common name for passerine birds belonging to the genus *Muscicapa*. They eagerly devour insects on the wing. Two species are summer visitors to England, where they breed.

FLY-OR'CHIS, in Botany, the *Orchis muscifera:* a plant, so called from the resemblance it bears in figure to a fly.

FLY'-TRAP, the *Dionæa Muscipula*, or Venus's Fly-trap, a North American plant allied to the Sundew. The leaves are divided into two parts, and each carries three minute bristles, which are so extremely irritable, that if a fly touches them, the two parts of the leaf collapse, and at the same time take the fly a prisoner. After a while they spontaneously open.

FLY'ERS (*fliegen*, to fly: *Ger.*), in Architecture, stairs that do not wind, but are made of an oblong square figure, and go straight forward, the second standing behind the first, and so on.

FLY'ING (*fliegen*, to fly: *Ger.*), the progressive motion of a bird, or other winged animal, in the air The parts of birds chiefly concerned in flying are the wings, by which they are sustained or wafted along. Flying is effected in the following manner:—the bird first bends his legs, and springs with a violent leap from the ground; then opens and expands the joints of his wings, so as to make a right line perpendicular to the sides of his body: thus the wings, with all their feathers, constitute one continued lamina. Being now raised a little above the earth, and vibrating the wings with great force and velocity against the subjacent air, that fluid resists, both from its natural inactivity and elasticity, and thus the whole body of the bird is moved forward. Birds never fly upwards in a perpendicular line, but always in a parabola. In a direct ascent, the natural and artificial tendency would oppose and, to a great extent, destroy each other, so that the progress would be very slow. In a direct descent they would aid one another, so that the fall would be too precipitate.

FLY'ING BUT'TRESS, in pointed Architecture, a buttress connected with the main building by an arch, which abuts against the springing of another arch in the interior—generally the vaulting of the nave. If these buttresses were built solid, their appearance would be heavy, and they would interrupt the vista along the sides of the church, &c. Their stability depends on the resistance derived from the weight of the vertical buttress, whence they spring.

FLY'ING FISHES These belong to the genera *Exocœtus* and *Cypselurus* of naturalists. They are allied to the garfish and saury pike of our coasts, and are remarkable for the extraordinary length of the pectoral fins. Voyagers in warm seas have often described their habit of rising into the air, in large bands, like a flight of larks or sandpipers, and sinking again into the sea, after a rapid course of several hundred feet. The cause of this movement is supposed to be an attempt to escape from other fishes. Before finally subsiding into the water, they frequently undulate, and even touch the crests of waves, as if to wet their dry fins. It has been denied that they move their fins during their flight, but the evidence of several good observers proves that they do. They have also been seen to change the direct line of their flight for one nearly at right angles, and this a shoal of them will do simultaneously.

FLY'ING PIN'ION, that part of a clock, to which is attached a fly or fan, which gathers air, and checks the rapidity of the clock's motion, when the weight descends, in the striking part.

FO'CAL DIS'TANCE (*focus*, a fire-place: *Lat.*), in Optics the distance between the centre of a lens, or mirror, and the *focus* or point at which the rays are collected.

FOCIM'ETER (*focus*: *Lat.*; and *metron*, a measure: *Gr.*), an instrument contrived for the purpose of enabling the photographer to ascertain the focus of the photogenic rays. The principle of the instrument is the placing before the camera at the same moment a circular arrangement of cards formed into segments, each segment being at a different distance from the lens. A photographic picture of all these is simultaneously produced. The picture of some one among them will always be found to be more distinct than those of the others, and it follows that the plate or paper is in the photogenic focus corresponding to that one.

FO'CUS (a fire-place: *Lat.*), in Optics, the point of convergence at which all the rays of light meet after passing through a convex lens. It should be observed, however, that the focus is not, strictly speaking, a *point*, but a small circle, which bears the same relation to the apparent diameter of the lens, that the image of any other object, formed in the focus of the lens or mirror, bears to the object itself. Only a point can give the image of a point.——FOCUS, in Geometry and conic sections. The focus of a *parabola* is a point in the axis having this property, that a radius drawn from it to any point in the curve makes the same angle with the tangent, at that point, that the tangent makes with the axis. Hence, if parallel rays of light fall on the parabola, they are reflected to the focus; or rays emitted from the focus will be reflected in a direction parallel to the axis. The foci of an *ellipse* are situated in the major axis, at equal distances from the centre; and the *sum* of two straight lines drawn from them to any point in the curve, is, with the same ellipse, always the same quantity. Also these two lines make equal angles with the tangent at that point. Hence rays of light, &c., emitted from one focus, are reflected to the other. The foci of an *hyperbola* are also in the major axis, at equal distances from the centre; but the *difference* between two straight lines drawn from them to any point in the curve, is, with the same hyperbola, always the same quantity; and these two lines make equal angles with the tangent at that point, but at opposite sides of the curve. Hence a ray of light emitted from one focus will be reflected into the direction of a ray coming from the other; or rays passing towards one focus will be reflected to the other.

FOD'DER (*futter*: *Ger.*), in Husbandry, any kind of food for cattle. *Green fodder* consists of grass, tares, &c.; *dry fodder*, of oats, barley, and beans.

FŒ'TUS (the young of any creature: *Lat.*), in Physiology, the child in the womb of its mother, after the fifth month of pregnancy. Before that time it is termed an *embryo*.

FOG (a storm: *Dan.*), in Meteorology, a dense vapour near the surface of land or water. Fogs generally arise from the nocturnal cooling of the atmosphere, which becomes incapable of retaining in solution the same quantity of water it held when at a higher temperature. A part, therefore, is precipitated as a cloud, which, if near the earth, is termed a fog. The heat of the day causes the air to redissolve the precipitated vapour, which enables the air to again become clear. The dense and gloomy fog so common in London is often due to a different cause. The wind carries the smoke of the city in a long train extending twenty or thirty miles; as may be seen in a clear day by any person on an eminence five or six miles from the city, and looking across in the direction of the wind. If the wind changes suddenly, this great body of smoke will be brought back in an accumulated mass, and, as this repasses the city, will be augmented by the smoke from every fire. Fogs have been observed which contained no moisture, and could be accounted for only by supposing them to be the vapours and ashes ejected by volcanoes, and diffused in the atmosphere by the wind.

FOG'-BANK, an appearance at sea in hazy weather which frequently resembles land at a distance, but which vanishes as it is approached.

FOIL (*feuille*, literally a leaf: *Fr.*), among jewellers, a thin leaf of metal placed under precious stones to increase their lustre and improve their colour. Hence anything of a different colour or quality, which serves to adorn or set off another thing to advantage, is termed a *foil*.——In Fencing, an elastic rod of steel, or sword without a point, used to fence with by way of exercise. It generally has at the end a button or piece of cork covered with leather.

FOLIA'CEOUS (*foliaceus*, leafy: *Lat.*), in Botany, having leaves, or being leaf-like. A foliaceous spike is one that has leaves intermixed with flowers.——In Mineralogy, having the form of a leaf or lamina; as, a *foliaceous* spar.

FO'LIAGE (*feuillage: Fr.*), in Architecture, the representation of leaves, flowers, and branches, intended to ornament and enrich capitals, friezes, pediments, &c.

FO'LIATE (*foliatus*, having leaves: *Lat.*), in Botany, furnished with leaves.

FO'LIATED (same *deriv.*), in Mineralogy, consisting of thin plates; lamellar; as, a *foliated* structure.

FO'LIATING (same *deriv.*), a term used for covering the backs of looking-glasses with a thin coat of tin and quicksilver.

FOLIA'TION (*folium*, a leaf: *Lat.*), in Botany, the leafing of plants.

FO'LIO (a leaf: *Ital.*), in account books, denotes a page, or rather both the right and left hand pages, these being marked with the same number.——FOLIO, a book of the largest size, the leaves of which are formed by once doubling a sheet of paper.

FO'LIOLE (a *dim.* from *folium*, a leaf: *Lat.*), in Botany, one of the single leaves, or leaflets, which together constitute a compound leaf.

FO'LIOUS (*foliosus*, leafy: *Lat.*), in Botany, having leaves intermixed with the flowers.

FO'LKLAND (*folk*, the people; and *land: Sax.*), in Saxon Law, land held by the commonalty at the will of the lord.

FO'LKMOTE (*folk*, the people; and *gemote*, to assemble: *Sax.*), a word used in England before the Norman conquest, to denote an annual assembly of the people, answering in some measure to a modern parliament. Some authors, however, allege that the folkmote was an inferior court, or the common-council of a city or borough.

FOL'LICLE (*folliculus*, a small bag: *Lat.*), in Botany, a seed-vessel, opening on one side longitudinally, and containing several seeds. Examples may be seen in the fruit of larkspur and columbine.

FOMENTA'TION (*fomentum*, a warm lotion: *Lat.*), the act of bathing any part of the body with hot water, or a decoction of herbs, &c., made hot, for the purpose of easing pain or dispersing tumours.

FONT (*fons*, a fountain: *Lat.*), a large basin or vessel, in which water is contained for baptizing infants or other persons. It is so called, probably, because baptism was usually performed among the primitive Christians at springs or fountains. The following Greek inscription, which reads *backwards and forwards* equally well, is often found on the walls of baptisteries, and on fonts:—ΝΙΨΟΝ ΑΝΟΜΗΜΑΤΑ ΜΗ ΜΟΝΑΝ ΟΨΙΝ (*nipson anomēmata mē monan opsin*)—'Wash away transgressions, not the appearance alone.'——FONT or FOUNT, a complete assortment of printing types of one size, including a due proportion of all the letters, points, figures, accents, &c.

FOOD (*futter: Ger.*), comprises all substances capable of digestion and assimilation. But the proximate principles, or elements, on which the nutritive properties of these depend, are very few. Those of vegetable substances are gluten and its modifications, starch, gum, sugar, and lignin or woody fibre: those of animal substances, albumen, gelatine, and their modifications. Both animal and vegetable substances afford fats and oils. Sometimes the nutritious parts of food are so combined with or protected by indigestible matters as to resist the solvent powers of the stomach, unless prepared or modified. Indurated lignin will pass unchanged through the stomach and bowels: hence the kernels of the apple, pear, &c., the seeds of the currant, gooseberry, &c., peas, beans, &c., wheat, barley, &c., on account of their covering of lignin, will not be digestible unless these coverings are broken down or removed. Much of the digestibility and nutritious power of the food of man is due to the chemical operations carried on in the kitchen. Meat is not only softened by heat, but new substances are generated in it: thus, *osmazone*, which gives such an agreeable odour and flavour, by roasting. The salt also, and the condiments employed, have their own uses; the former contributing an element to the gastric juice, and the latter stimulating the stomach. If the nutritive elements of food are few, its ultimate elements are still fewer, being little more than carbon, hydrogen, oxygen, and nitrogen. Among vegetable substances, albumen, including gluten, is the only one which contains much nitrogen; all the others may actually be considered as compounds of *charcoal and water*. An animal cannot subsist long on food containing no nitrogen, or on food exclusively of one kind, though habit will do much in accustoming the stomach to particular kinds of food. Nothing is fit for food which has not undergone organization by forming a part of an animal or a vegetable. Hence food never can be made from its ultimate elements.

FOOL'S PARS'LEY, the *Æthusa Cynapium* of botanists, an umbelliferous plant, found abundantly in waste ground, and resembling parsley sufficiently to deceive the ignorant. It is poisonous, acting like hemlock.

FOOT (*fuss: Ger.*) Animals are distinguished, with respect to the number of their feet, into *bipeds*, two-footed, as men and birds; and *quadrupeds*, four-footed, as most land animals. The human foot consists of the tarsus, metatarsus, and phalanges or toes. The *tarsus* is composed of seven bones in two rows, in the first of which is the *os calcis* or heel bone. The *metatarsus* is composed of five bones, one to each toe; whilst the toes are composed, like the phalanges of the fingers, of fourteen bones, the big toe having two, the rest three each. Man is distinguished from his relatives in the zoological scale, amongst other things, by being able to plant his foot flat on the ground, whilst the foot of the quadrumana, when attempting to walk, rests on its outer side.——Foot, a measure of length, varying in different countries, but in all divided into twelve parts. A *square foot* is a square surface, each of whose four sides is a foot in length. A *cubic* or *solid foot* is a solid contained within six surfaces, each of which is a square foot. A square foot contains 144 square inches, and a cubic foot 1728 cubic inches.

FOOT'STALK, in Botany, the stalk by which a leaf is connected with the branch; a petiole. Leaves destitute of petioles are termed *sessile*.

FOR'AGE (*fourrage: Fr.*), all kinds of provender for cattle, especially for horses in time of war.——*A foraging party* is a body of men sent out to collect provisions, either for the horses or for the troops.

FORA'MEN (*Lat.*), in Anatomy, a small opening. The *foramen ovale* is the opening between the two auricles of the heart of the fœtus, which before birth allows the blood to pass from one to the other without going through the lungs. It closes when the child is born, for, the blood being no longer purified by passing through the lungs of the mother, it is indispensable that it should now pass through the lungs of the infant. Hence, if a child has *ever* breathed, its lungs will *float* in water, from their air-cells having been rendered light by inflation. In Botany, the foramen is an opening through the integuments of an ovule by which the fecundating influence of the pollen reaches the nucleus.

FORAMIN'IFERA (same *deriv.*), animals belonging to a very low type of organization, inhabiting small shells, usually calcareous, which are frequently of elegant form. They belong to the class of Rhizopods, and have received their name from the shell being, in many instances, pierced with minute holes, through which the animal extends parts of its body for the purpose of collecting food. The animals are destitute of special organs, and consist of a mass of featureless matter called *sarcode*. The shells are sometimes one-chambered, but generally they are divided into several chambers, being increased by additional chambers as the animal grows. The forms are very varied, globular, flask-shaped, dagger-shaped, nautilus-like, &c. Some of the minute forms are interesting objects for the microscope. They are all inhabitants of the sea, and, whilst some are found on shore-seaweed, others have been brought up from a depth of 1800 fathoms. Their fossil remains abound in prodigious numbers in the tertiary beds. The miliolite limestone of the Paris basin, which is largely employed in building, is composed entirely of foraminifera. [See Nummulite.] A considerable portion of the chalk beds is formed of minute foraminiferous shells.

FORCE (*Fr.*), in Mechanics, whatever produces, modifies, or destroys motion. The effect of a force depends on its intensity, the point of the body at which it acts, and its direction. It may be either uniform or variable. If *uniform*, as long as it continues to act on a body, it *uniformly accelerates* its velocity. If *variable*, the effect is correspondingly modified. Sometimes there is a *combination of forces*, that is, two or more forces act together on the same body; and the *resultant*, that is, the resulting force, except when their directions are parallel, is in the direction of none of them.——Physical Force, the force of material bodies.——Moral Force, the power of acting on the reason in judging and determining.——Force, in Law, signifies any unlawful violence offered to the person or to property. A *forcible entry* is a violent and actual entry into houses or lands; and a *forcible detainer* is a violent withholding the possession of lands, &c., so that the person who has a right of entry is hindered therefrom.——Living Force, or *vis viva*, a term formerly used by Mathematicians to denote the action of a force when it is modified in such a way as to be proportional to the square of the velocity.——Conservation of Force. It is an axiom in physical science that force can neither be created nor destroyed. Since matter is only known by its forces, to admit that force is destructible would be to admit that matter can cease to exist. When we see a case of the apparent disappearance or suspension of a force, it is simply the transference of its exertion from one into some other direction. Inertia is a pure case of the conservation of force. It has a strict relation to force in any way acting upon a body, and it enables a body to take up and conserve a given amount of force, until that force is transferred to other bodies, or is changed into an equivalent of some other form.

FOR'CEPS (*Lat.*), in Surgery, an instrument for holding or gripping anything. Also, a pair of scissors for cutting off or dividing the fleshy membranous parts of the body.

FOR'CING (*forcer*, to force: *Fr.*), in Horticulture, a method of obtaining fruits and flowers before their season, by the application of heat.——The artificial ripening of wines by means of heat, and their fining down, so as to render them fit for immediate use, are also called *forcing*.

FORE (*Sax.*), a sea term for near the stem; 'fore and aft' means from stem to stern

FO'RECASTLE, a short deck in the forepart of the ship above the upper deck. It contains the berths of the common sailors.

FO'RECLOSURE, in Law. [See EQUITY OF REDEMPTION.]

FO'REMAST, the mast of a ship which is placed in the forepart or forecastle, and carries the foresail and foretopsail yards. ——*Foremast-men*, those who take in the topsails, furl the sails, &c.

FORE-SHORT'ENING, in Painting, the art of correctly conveying to the mind the impression of the entire length of an object, when represented as viewed in an oblique or receding position.

FOR'EST (*forst: Ger.*), a large tract of land covered with trees, differing from a *wood* chiefly in its extent, and from a *plantation* in its young trees growing of themselves without being sown or planted.——The *forests* in England are of such great antiquity that, excepting the New Forest in Hampshire, made by William the Conqueror, and Hampton Court, by Henry VIII., it is said that there is no record or history which makes any certain mention of their origin; though they are noticed by several writers, and in many of our laws and statutes. The four principal forests are the New Forest in Hampshire, Sherwood Forest in Nottinghamshire, Dean Forest in Gloucestershire, and Windsor Forest in Berkshire.

FO'RESTALLING (*fore*, a front; and *stal*, a station: *Sax.*), the act of buying or bargaining for any provisions or merchandise, before they reach the market to which they are going, with an intent to sell the same again at higher prices. It was formerly punishable.

FO'RESTAY, in a ship's rigging, a rope reaching from the foremast head towards the bowsprit end, to support the mast.

FOR'FEITURE (*forisfactura*, an expulsion or outlawry: *Lat.*), in Law, the loss of some right, privilege, estate, goods, lands, or employments, &c, for neglecting to do one's duty, or for some crime committed.

FORFIC'ULA (a small pair of shears: *Lat.*), in Entomology, the *Earwig*, which see.

FORGE (*Fr.*), a small furnace, in which smiths and other artificers in iron, steel, &c., heat their metals red hot, in order to soften and render them more malleable. The word *forge* is also used for a large furnace or *ironworks*, in which the ore taken from the mine is melted down. [See IRON.]

FOR'GERY (*forgeur*, a forger: *Fr.*), in Law, the fraudulent making or altering any deed or writing, to the prejudice of another man's right; particularly the counterfeiting the signature of another with intent to defraud.

FORGET'-ME-NOT, the *Myosotis palustris* of botanists (nat. ord. *Scrophulariaceæ*), a small herbaceous plant, growing in damp places, whose blue flowers are well known. It bears a similar name in German, Dutch, and Danish.

FORLO'RN HOPE, in Military affairs, a detachment of men appointed to lead in an assault, to storm a counterscarp, enter a breach, or perform any other service attended with great and imminent peril.

FORM (*forma*, an appearance: *Lat.*), in Physiology, the essential and distinguishing modification of the matter of which any body is composed.——FORM, in Law, the rules established and requisite to be observed in legal proceedings.——FORM also denotes the external appearance or surface of a body, or the disposition of its parts, as to length, breadth, and thickness. —— FORM, in Printing, the pages or columns of type, properly arranged, and enclosed and locked in an iron frame called a chase, for the purpose of being put to press. There are two forms required for every sheet, one for each side; and each form consists of more or fewer pages, according to the size of the books.

FOR'MA PAU'PERIS (in the character of a pauper: *Lat.*), a Law term. When a person has just cause of suit, but is so poor that he cannot defray the usual charges of suing at law or in equity, on making oath that he is not worth 5*l.* except his wearing apparel, and producing a certificate from some lawyer that he has good cause of suit, the judge will admit him to sue *in formâ pauperis*: that is, without paying any of the usual fees to court, counsel, &c. He will be exempt from these as plaintiff, but not as a defendant. If he lose his suit he will not have to pay costs; but he may be made to suffer other punishment, at the discretion of the judges. He may recover costs.

FORMA'TION (*formatio*, a fashioning: *Lat.*), in Geology, any assemblage of rocks having some common character, such as origin, age, or composition.

FOR'MIC A'CID (*formica*, the ant: *Lat.*), an acid which received its name from being found in the bodies of ants. It may be obtained by several methods. It is composed of carbon, oxygen, and hydrogen. Its salts are termed *formates*.

FOR'MULA (a rule: *Lat.*), a short way of expressing acts by notation. Thus, in Chemistry, *carbonic acid* consists of one atom of carbon, with two of oxygen; and is indicated by CO_2.——In Mathematics, a general theorem or literal expression for resolving any part of a problem.——In Medicine, a prescription.——In Theology, a profession of faith.

FOR'MYLE (*formic*; and *ulē*, the material of which a thing is made: *Gr.*), a chemical compound, the hypothetical radical of *formic acid*.

FORTIFICA'TION (*fortis*, strong: and *facio*, I make: *Lat.*), the art or science of fortifying a place, or of putting it in such a state, that every one of its parts defends, and is defended by, some other parts, by means of ramparts, parapets, moats, and other bulwarks; so that a small number of men within may be able, for a considerable time, to withstand the assaults of a numerous army without.——ANCIENT FORTIFICATION. In early times, when the sling and bow were the principal weapons of offence, a single wall, or a bank of earth, behind which missiles could be discharged at assailants, was a sufficient protection. Projecting towers, afterwards added, increased the front of the besieged, and enabled them to attack the besiegers in flank when they attempted to scale the wall. The invention of the battering-ram rendered it necessary to increase the thickness of the wall; and projecting galleries, called *machicolations*, were constructed along its summit, and round the towers, through the pierced floors of which stones and other missiles were showered down. Apertures or loop-holes for discharging arrows were pierced in the walls and battlements; and the whole was surrounded with a *moat* or deep ditch—if possible, filled with water. But the invention of gunpowder rendered a different system of fortification necessary; walls of masonry, which, however thick, could not long withstand the assault of artillery, were exchanged for mounds of earth.——MODERN FORTIFICATION. The principal works belonging to a modern fortification are the ditch or trench made round each work; the rampart, or elevation of earth, raised along the faces of any work, to defend the inner portion; the parapet, or that part of a rampart which serves to protect the troops planted there; the bastion, that part of the inner enclosure of a fortification making an angle towards the field; the counterscarp, the slope of the ditch facing the body of the place; the covered way, the space extending round the counterscarp; and the glacis, the part beyond the covered way, to which it serves as a parapet. In recent times, however, fortification has undergone important changes, and engineers have adopted different systems; but those which have acquired the greatest reputation in Europe, are the systems of count Pagan, the baron de Coehorn, von Scheiter, and marshal Vauban.

FO'RUM, in Rome, a public place, where causes were judicially tried, and orations delivered to the people. It was a large open parallelogram, surrounded by porticoes. There were six of these forums, viz. the *Romanum*, *Julianum*, *Augustum*, *Palladium*, *Trajanum*, and *Sallustii* forum. The chief of these was the *forum Romanum*, called, by way of eminence, *the forum*. In it was the rostrum, or pulpit, where the Roman orators pleaded, or harangued the people, &c. Here too was the *comitium*, or hall of justice, with the sanctuary of Saturn, the temple of Castor, &c., altogether producing a most splendid effect.——The word *forum* was also applied to a place of traffic, or market place: of these there were vast numbers, as the *forum piscarium*, *olitorium*, &c. They were generally called *fora venalia*, in distinction from the first-mentioned, which were called *fora civilia*. ——FORUM, in Law, a term sometimes used for a court of justice; the place where disputed rights are settled. Hence *forum competens*, a competent jurisdiction; *forum incompetens*, a court not authorized to try the cause, &c.

FOSS (*fosse: Fr.; from fossio, a digging: Lat.*), in Fortification, a ditch, commonly full of water, lying between the scarp and the counterscarp.——FOSS, or FOSSA, in Anatomy, a kind of cavity in a bone, with a large aperture, but no exit or perforation.——FOSS-WAY, one of the four principal ancient highways of England, having a ditch on one side. They crossed the kingdom in various directions, and are supposed to have been the work of the Romans. One of them reached from Totness, in Devonshire, to Barton-on-the-Humber.

FOS'SILS (*fossile: Fr.;* from same *deriv.*), in Natural History, the remains of ancient organic existences discovered in the earth. They are usually converted entirely into stone, all the animal matter having been removed. The substituted material is in some cases silex, in others lime. Of vertebrate animals, not only have the bones and teeth been preserved in this way, but their footprints have been retained for our inspection. Shells are the most abundant forms of animal remains. Sometimes only the impression of the external surface is left; sometimes only that of the internal surface, leaving a cast or mould; and occasionally the space between the outer and inner surfaces having been left vacant by the gradual destruction of the shell, it has been afterwards filled up by the infiltration of another substance, and thus an accurate representation of both the exterior and interior surfaces is obtained. As to vegetable remains, sometimes there is only an impression of the exterior, sometimes the vegetable matter itself is preserved as carbon, and sometimes the vegetable is converted into mineral matter. Travellers have often expressed their astonishment at finding the trunks of trees, many feet in circumference, changed into silex in such a manner that every vessel and microscopic pore has been perfectly preserved.

FOTH'ERING, a sea term for stopping leaks in the bottom of a ship, by letting down a sail by the corners, and putting chopped rope-yarn, wool, oakum, &c., between it and the ship's side. By repeating this operation several times, these substances are sometimes sucked into the cracks, so as either wholly or partially to stop the leak.

FOUGA'SS (*Fr.*), in military engineering, a small mine, from six to eight feet under ground.

FOUNDA'TION (*fondation: Fr.;* from *fundamentum: Lat.*), the basis or groundwork of anything; usually that part of a building which lies under the ground.——FOUNDATION denotes also a donation or legacy, either of money or lands, for the maintenance and support of some community, school, or charitable institution.

FOUN'DER (*fundator: Lat.*), one from whom anything originates; as the founder of a sect of philosophers, the founder of a family. Also one who endows any public establishment.——FOUNDER (*fundo*, I pour out: *Lat.*), likewise implies an artist who casts metals in various forms for different uses; as a founder of cannon, bells, statues, printing type, &c.——TO FOUNDER, in

Nautical Language, is to sink to the bottom of the sea, an expression derived from the French *fondre*, which is connected with the Latin *fundus*, a bottom.

FOUN'DRY (*fonderie: Fr.*), from *fundo*, I pour out: *Lat.*), the building in which metals are cast in moulds or shapes. Various furnaces are used in the operation. The *wind furnace* is either square or circular; it has generally three apertures—one above, for the purpose of introducing the crucible and fuel, usually closed by a tile or brick; another below, to admit the air, which is to pass through the fuel; and the third communicating with the chimney, which should be lofty, and supplied with a damper. The *blast furnace* differs from the wind furnace, in having no grating, and in the air being supplied by a bellows or a blowing machine. The *reverberating furnace* is so constructed that the flame and hot air from the fire-place are directed into a separate cavity, called a *hearth*, where the materials to be fused are laid. The melted metal is either run out through an aperture in the bottom, or lifted out with ladles. The *moulds* are made of a variety of materials: those for stereotype founding, of plaster of Paris; those for bronze, of a mixture of plaster of Paris and brickdust, prepared with the greatest care. Iron is generally cast in sand; brass, and other metals, in clay; and sometimes the moulds are of cast iron. Iron founding is far the most important branch of the art carried on in this country, which abounds with the two substances almost indispensable to it—iron ore and coal.

FOUN'TAIN (*fontaine: Fr.; from fons: Lat.*), in Natural Philosophy, a spring or source of water rising out of the earth. Among the ancients, fountains were held sacred, and even worshipped as a kind of divinities.——An *artificial fountain*, or *jet d'eau*, is water ejected from a pipe, by being either raised to a higher level than the top of the pipe, or forced out by an engine, &c. [See ARTESIAN WELLS.]

FOVIL'LA (*foveo*, I nourish: *Lat.*), in Botany, the matter contained within the grains of pollen, and the fructifying principle of the plant.

FOX (*fuchs: Ger.*), the *Vulpes vulgaris* of zoologists, a well-known animal, closely related to the dog, with a sharp muzzle and a long bushy tail. It is a native of Europe and the northern parts of Asia and America. It burrows in the earth, and is generally described as crafty and cunning beyond measure. Foxes prowl about in the night, and prey on poultry, rabbits, and hares; but they are very timid, fleet, and, when old, sagacious in evading their enemies. They emit an odour which enables dogs to scent and follow them. Foxes breed only once a year, and bring forth commonly in April four or five young, which, like puppies, are born blind.

FOX'-GLOVE, the *Digitalis purpurea* of botanists, nat. ord. *Scrophulariaceæ*. Its leaves, when carefully dried and powdered, or made into a tincture or infusion, are used in medicine. In small and repeated doses, it lowers the pulse in a very extraordinary way, and produces debility and fainting; combined with other substances, it forms an ingredient in some powerful diuretics.

FRAC'TION (*fractio*, a breaking: *Lat.*), in Arithmetic and Algebra, a combination of numerical or literal quantities representing one or more parts of a unit or integer; thus $\frac{4}{5}$ is a fraction, formed by dividing a unit into five equal parts, and taking four of them. A fraction consists essentially of two numbers, usually placed one over the other, and separated by a line: the lower tells the number of parts into which the unit is divided, that is, the denomination of the quantities in question, and is called the *denominator;* the upper tells what number of these parts is taken, and is called the *numerator.* If the numerator is equal to, or greater than, the denominator, since the quantity is then not less than unity, it is called an *improper* fraction. If the denominator consists of 10, or some power of 10—that is, if it consists of 1, with one or more ciphers to the right hand—it is a *decimal* fraction: otherwise it is a *vulgar* fraction. Thus $\frac{3}{100}$ is a decimal fraction, $\frac{3}{200}$ a vulgar fraction. Decimal fractions are too frequently confounded with decimals. Decimal fractions consist of a numerator and denominator, like any other fractions. Decimals follow the laws of the ordinary system of numbers; the value of a quantity expressed by them being marked not by a denominator, but by their *position* with reference to the *decimal point.* $\frac{3}{1000}$ is a decimal fraction; 0·003, its quotient or equivalent, is a decimal.

FRAC'TURE (*fractura: Lat.*), in Mineralogy, the manner in which a mineral breaks, which is one of its specific characters. The fracture is either compact or smooth, foliated or lamellar, conchoidal, striated, or nodular, &c.——FRACTURE, in Surgery, the breaking of any bone by an external act of violence. It is *simple* when the bone only is divided; *compound*, when the bone is broken, with a laceration of the integuments.

FRÆ'NUM (a bridle: *Lat.*), in Anatomy, a term applied to some membranous ligaments of the body: as, the *frænum linguæ*, or ligament under the tongue. Sometimes it ties down the tongue too close to the bottom of the mouth, and then requires to be incised or divided, in order to give this organ its proper and free motion.

FRANC (from being originally stamped with the figure of a Frank or Frenchman), a French coin, worth 9·69*d.* sterling.

FRAN'CHISE (*Fr.*), in a general sense, signifies some privilege, or exemption from ordinary jurisdiction. A franchise may be vested either in bodies politic or corporations; in borough towns, or in individuals. Corporate liberties, being usually held by charter, are all said to be derived from the crown, but some lie in prescription without any charter.

FRANCIS'CANS, Friars-Minor, or Grey-Friars, the religious order of St. Francis, by whom they were founded about the year 1209.

FRANK (*franc*, free: *Fr.*), an exemption of letters from paying postage, which, before the 'penny postage' act came into operation, January 10, 1840, was enjoyed to a certain extent by all members of parliament. It is said that, before this act abolished the privilege of *franking*, nine millions of letters were annually sent post-free.——**FRANK-ALMOIGNE**, in Law, a tenure by which a religious corporation held lands to them and their successors for ever, on condition of praying for the soul of the donor.——**FRANK-CHASE** or **FREE CHASE** was the liberty of keeping beasts of chase or royal game, protected even from the owner of the land himself, with a power of hunting them.——**FRANK-FOLD**, a privilege which the lord had of folding his tenant's sheep within his manor.——**FRANK-FREE**, a term much used in our old law: thus frank-pledge freemen were pledges or sureties for the good behaviour of those who were of their community.

FRANK'INCENSE, the gum-resin *Olibanum*, which is the produce of an Indian tree, the *Boswellia serrata*, nat. ord. *Amyridaceæ*. Sprinkled on live coals, it exhales a fragrant and powerful odour.

FRANK'LINITE, a ferriferous oxide of zinc, found in New Jersey, North America, and named from Dr. Franklin.

FRANKS, an appellation given by the Turks and other nations of Asia to all the people of the western parts of Europe, English, French, Italians, &c.

FRATER'NITIES (*fraternitas*, a brotherhood: *Lat.*), in the middle age consisted of pious laymen, who formed societies for the purpose of relieving the sick and destitute and performing other Christian duties

FREE-BENCH, in law, a widow's dower in a copyhold estate.

FREE'HOLD, a legal term which refers either to the quantity of estate which a man may have in lands or tenements, or to the tenure by which lands and tenements are held. As to the quantity of estate he may have, it may be either of inheritance or not of inheritance: if of inheritance, it may be either fee-simple, fee-tail, or fee simple conditional; if not of inheritance, it is for life, or an uncertain period limited within the term of a life. As to the tenure, freehold tenure is derived from the ancient free socage: hence copyholds are not within this denomination, but lands held by custom of the manor, not by a copy of court roll, are customary freeholds.

FREE'HOLDER, the possessor of a freehold estate, who is thereby qualified to vote for a knight of the shire, or representative of the county in parliament, if the estate is of the annual value of 40s.

FREE'MAN, in the middle ages one who belonged to a class below the gentry, but above the villeins. The citizens and burghers of chartered towns, the socagers whose tenure was free, and tenants for term of life, were freemen. At the present day, a freeman is one who has been in due form admitted to the freedom of a city or borough.

FREE'MASONRY. A well-known institution, the origin of which has given rise to great discussion. There is no doubt that the fraternity of architects or builders was very widely diffused in the middle ages, and it is thought that we owe to it the erection of the magnificent cathedrals, &c., so different from the other efforts of those times. It is not known when the society became changed from a professional body to one that admitted persons of every description.

FREE'STONE, a hard and durable kind of gritstone, so called from its being of such a nature as to cut freely in any direction: such are the Portland stone and the freestone of Kent. A granite which works freely is in some places called freestone.

FREE'ZING (*frieren*, to freeze: *Ger.*), in Philosophy, the conversion of a fluid body into a firm and solid mass by the action of cold. Upon the principle of the absorption of heat are founded the various artificial methods of producing cold and congelation. Evaporation causes cold, particularly when the vapour is removed as fast as produced. If a body suddenly liquefies without the application of external heat, cold is produced; this is the principle of freezing mixtures. When a body, air for instance, is made suddenly to expand, it abstracts heat from the surrounding bodies. In Spain, a kind of earthen jars, called *buxaros*, is used, the material of which is so porous, being only half baked, that the outside is kept moist by the water that filters through it; and, though placed in the sun, the water in the jar becomes as cold as ice. It is a common practice in China to cool wine or other liquors by wrapping a wet cloth round the bottle and hanging it up in the sun. The water in the cloth evaporates, and thus cold is produced. Ice may be made at any time by the evaporation of ether. The most intense cold yet known is obtained by the evaporation of a mixture of solid carbonic acid and sulphuric ether, the temperature being lowered to 166° Fahr. below the freezing point. The old nobles of Russia used to obtain very strong and intoxicating drink by placing their wines and spirits in the ice of their rivers: the water they contained froze and separated from the spirits so as to be easily removed. This plan has been adopted for concentrating lemon juice, &c. [See ICE-MAKING MACHINES.]

FREIGHT (*fret: Fr.*), in Navigation and Commerce, the hire of a ship, or of a part of it, for the conveyance of goods from one place to another; or the sum agreed on between the owner and the merchant for the hire and use of a vessel. In a more extended sense, it means the burden of such ship. Freight being the return made for the conveyance of goods or passengers to a particular destination, no claim arises for its payment in the event of a total wreck; and our law authorities have decided, that, in case of a total loss with salvage, the merchant may either take the part saved or abandon it. But after the merchant has made his election, he must abide by it.——**FREIGHT** is now used in a large portion of America as a term to indicate the merchandise sent by a goods train on a railway, the latter being called a *freight train*.

FRENCH CHALK, in Mineralogy, a variety of indurated talc, in masses composed of small scales. It combines with grease, and is useful in drawing.

FRENCH HORN, a musical wind instrument made of copper. It possesses a compass of three octaves, and is capable of producing tones of great sweetness.

FRENCH POL'ISH, a solution of shellac in spirits of wine, with sometimes a little gum elemi; a small quantity of linseed-oil is added to it at its application. It is laid on with a ball of cotton wool, and rapidly rubbed in the direction of the fibres of the wood; and when dry, it is finished by friction with tripoli and oil.

FRES'CO (fresh: *Ital.*), a species of painting with mineral colours on walls, which will endure the weather. It is executed on fresh plaster, so that the colours incorporating with it, and drying on the wall, become very durable in favourable climates. In our humid climate it does not succeed. This mode of painting is of very early invention. It is asserted that there are specimens of fresco-painting extant of the time of Constantine the Great. Fresco was long neglected, but began to revive in the 15th century; but though Michael Angelo and Raphael produced some noble specimens of the art, it fell again into disrepute until practised by the Germans in recent times. As it is very difficult to alter the colour when once absorbed, it requires great exactness.

FRET (*frethan*, to adorn: *Sax.*), in Architecture, an ornament consisting of two lists or small fillets variously interlaced or interwoven, and running at parallel distances equal to their breadth.——**FRETWORK** is sometimes used to fill up and enrich flat empty spaces; but is most frequently employed in roofs which are fretted over with plaster-work.——**FRET**, in Heraldry, a bearing composed of six bars, crossed and interlaced; by some called a *true lover's knot*.——**FRETS**, in Music, certain short pieces of wire fixed on the fingerboards of guitars, &c., at right angles to the strings, and which, as the strings are brought into contact with them by the pressure of the fingers, serve to vary and determine the pitch of the tones. Formerly these frets or stops consisted of strings tied round the neck of the instrument.

FRETTS (*frotter*, to rub: *Fr.*), a term used by miners to express the worn sides of the banks of rivers in mine countries.

FRI'AR (*frère*, a brother: *Fr.*), a term common to all monks, but specially applied to those of the mendicant orders, the four chief of which were the Dominicans, Franciscans, Carmelites, and Augustinians. In London there are several places that retain the names of the friars who formerly had their monasteries there, Black Friars, White Friars, Austin Friars, &c.

FRIC'TION (*frictio: Lat.*), in Mechanics, the rubbing of the parts of engines and machines against each other, or upon surfaces along which they may be drawn or rolled, whereby a great part of the power applied is lost. The amount of friction depends on:—1. The roughness of the contiguous surfaces. 2. The irregularity of the figure, which arises either from imperfect workmanship or from the pressure of one body on another. 3. An adhesion, or attraction, which is more or less powerful according to the nature of the bodies in question. 4. The interposition of extraneous bodies, such as moisture, dust, &c. It has been found by experiment that friction diminishes with the velocity, and it varies with the surface rubbed or with the specific pressure, i. e. the pressure on the unit of surface. There is no extra amount of friction on starting from rest to motion. The resistance arising from friction performs important offices in nature and the works of art. Were there no friction, all bodies on the surface of the earth, that is, almost everything constructed by man, would fall in pieces with the slightest strain, as the wedge, the screw, and the nail would be powerless to keep them together. The least motion would be likely to dash one thing against another; but at present, whenever a body acquires a great velocity, it soon loses it by friction against the surface of the earth. The friction of water against the surfaces it runs over soon reduces the rapid torrent to a gentle stream. The fury of the tempest is lessened by the friction of the air on the surface of the earth, and the violence of the ocean is subdued by the friction of its own waters against coasts, &c. Friction may be greatly diminished by causing surfaces working together to be of different materials, which prevents the attraction of cohesion from coming so powerfully into action; by interposing oil or some anti-friction substance; by using wheels and friction rollers, which make the friction as much less than it otherwise would be, as the diameter of the axle is less than that of the wheel or roller attached to it. Friction is one of the most effective means of arresting motion. Hence the use of *breaks* on railways, and *friction bands* with machinery.——**FRICTION**, in Medicine, the rubbing any part of the body with the hand, flesh-brush, flannel, or other substance, or with oils, liniments, &c., with a view to the preservation or restoration of health; it is often found a most efficacious remedy.

FRI'DAY (*Freitag: Ger.*), the sixth day of the week, so called from Frea, or Friga, a goddess worshipped by the Saxons on this day. Every Friday, unless Christmas day fall upon it, is either a day of abstinence or a fast day in the Roman Catholic church.

FRIEZE (*frise: Fr.*), in Architecture, that part of the entablature which is between the architrave and cornice. It is usually enriched with figures of animals or other sculptured ornaments.

FRIG'ATE (*frégate: Fr.*), a ship of war, having one covered gun-deck, and more than 28 guns.

FRIGATOO'N, a Venetian vessel, built with a square stern, without any foremast; it is used in the Adriatic.

FRI'GID ZONE (*frigidus*, cold: *Lat.*), the space about either pole of the earth, terminated by a parallel of 76½ degrees of latitude, called the *polar circles*. Within the latter, the sun remains visible in summer, and invisible in winter, for a space of time depending on the distance of the place from either pole. At the pole itself the sun remains half a year above and half a year below the horizon. [See CLIMATE.]

FRINGILL'IDÆ, in Ornithology, the family of finches, including several genera with well known species, such as the chaffinch, house sparrow, goldfinch, and linnets.

FRIT or FRITT (*fritte*: *Ger.*), in the glass manufacture, the ingredients of which glass is to be made after they have been calcined in a furnace. It is of different kinds, according to the quality of the glass, but is chiefly composed of silex and alkali.

FRITH (*fretum*, a narrow sea: *Lat.*), an arm of the sea, or the opening of a river into the sea; as, the *frith* of Forth, the *frith* of Clyde, &c.

FRITH'GILD (*frith*, peace; and *gild*, a fraternity: *Sax.*), in Archæology, a guildhall; also a company or fraternity.

FRITILLA'RIA, a genus of bulbous-rooted plants with showy flowers, nat. ord. *Liliaceæ*.

FRIZE (*Frise*, Friesland: *Fr.*—because first made there), a coarse kind of woollen cloth.

FROG (*frosch*: *Ger.*), a well-known animal of the Batrachian order, in the class of *Amphibia*. It is oviparous, and the young when hatched are called tadpoles. They have a tail, but no legs, and being furnished with gills, they live in the water. The tail afterwards drops off, legs are developed, the gills disappear, and lungs are substituted. Having undergone this metamorphosis, they live henceforth on land. Frogs remain in a torpid state during winter. Besides the common frog, there are a great many other species, the most singular of which is that called the *bull-frog*, a native of the northern parts of America. This animal, when the limbs are extended, measures nearly two feet, the trunk of its body being about eight inches long and four or five in breadth. It is very voracious, and frequently swallows the young of water-fowl before they have strength to shift for themselves. Its croaking is so loud as to resemble the roaring of a bull heard at a distance, whence its name.——FROG, in Farriery, the hard projecting substance in the hollow of a horse's foot.

FROND (*frons*, a leafy branch; *Lat.*), in Botany, the leaf of a fern.

FRONDES'CENCE (*frondesco*, I get leaves: *Lat.*), in Botany, the precise time of the year and month in which each species of plant unfolds its leaves.

FRONT (*frons*, the forehead: *Lat.*), in Perspective, a projection or representation of the face or fore part of an object, or of that part directly opposite to the eye.

FRON'TAL (*frontalia*, an ornament for the forehead; *Lat.*), in Architecture, a small pediment or frontispiece over a small door or window.——In Medicine, a preparation to be applied to the forehead.——FRONTAL BONE, in Anatomy, the front bone of the head, which forms the forehead.

FRONTA'LIS (same *deriv.*), in Anatomy, an epithet for a muscle of the forehead, which serves to contract the eyebrows.

FRON'TISPIECE (*frontispice*: *Fr.*), in Architecture, the principal face of a building. ——An ornamental engraving fronting the first page of a book.

FROST (*Ger.*), in Meteorology, the congelation of water, or of the vapours of the atmosphere, by cold. This occurs when the mercury, in Fahrenheit's thermometer, sinks to 32°. At this temperature, water begins to freeze unless kept in motion. Frost is very injurious to vegetables, particularly when they are saturated with moisture, on account of a previous thaw or heavy rains. Masses of ice formed within a tree, by the expansion which takes place at the moment of congelation, cause a rupture of the vegetable fibre. *Hoar frost*, which occurs chiefly in autumn and spring, is merely frozen dew.

FRUCTIFICA'TION (*fructus*, fruit: and *facio*, I make: *Lat.*), in Botany, the part composing the fruit.

FRUIT (*Fr.*; from *fructus*: *Lat.*), in Botanical language, the ovary arrived at maturity; but the term is generally extended to whatever is combined with the ovary, when it is ripe.

FRUS'TUM (a fragment: *Lat.*), in Mathematics, part of some solid body, separated from the rest.——FRUSTUM OF A CONE, the part of a cone that remains when the top is cut off by a plane parallel to the base; if cut off otherwise, it is called a *truncated cone*.

FRUTES'CENT (*frutex*, a shrub: *Lat.*), in Botany, an epithet for that which, from herbaceous is becoming shrubby; as a *frutescent* stem. *Fruticose* signifies shrubby.

FRU'TEX (*Lat.*), in Botany, a *shrub*, a plant having a woody stem, but under the height of 17 or 18 feet.

FU'CUS (*Lat.*), the name given by the ancients to a plant, from which a material for dyeing woollen and linen cloths was procured. It was probably the lichen *Roccella tinctoria*, and the other species, from which *orchil* and *cudbear* are obtained. In modern botany, it is a genus of marine algæ. The word, or its plural form *fuci*, is frequently applied to the whole tribe of seaweeds.——FUCUS, a composition anciently applied on the face to beautify it and heighten the complexion. The fucus of the Roman ladies was a kind of white earth or chalk, brought from Chios and Samos.

FU'EL (*fuayl*: *Nor. Fr.*), any material which serves to maintain fire; as alcohol, tallow, coal, &c.; but the term is more properly limited to coal, coke, charcoal, wood, and a few other common sources of heat. Whatever the substance used as fuel, its ultimate elements are carbon, hydrogen, or both; and the heat obtained is derived from their combination with the oxygen of the air. Unless fuel is free from moisture, much of the heat which would be otherwise available is lost in converting the water into vapour. Hence the superiority of dry over green wood, and of charcoal over wood: hence also coke gives a greater heat than coal, which contains vaporizable bodies which must be driven off at an expenditure of heat. The following are the quantities of water which may be raised from 32° to 212° Fahr. by one pound of the most ordinary kinds of fuel:—

Fresh wood . .	25 lbs. of water.
Dry wood . . .	35 „ „
Turf	26 „ „
Turf when dense .	30 „ „
Pit coal . . .	60 „ „
Coke	65 „ „
Dry charcoal . .	73 „ „

Charcoal has a very great tendency to absorb water from the atmosphere, which greatly diminishes its heating powers.

FUGUE (*Fr.*; from *fuga*, a flight: *Lat.*), in Music, a species of composition, in which the different parts follow one another, each repeating in order what the first had performed, but at a certain interval above or below the preceding part.

FUL'CRUM (a prop: *Lat.*), in Mechanics, the prop or support by which a lever is sustained.

FULGURA'TION (*fulguratio*, sheet lightning: *Lat.*), in the art of assaying, a term for the sudden brightening of the melted gold and silver in the *cupel*, when the last film of oxide of lead, or copper, leaves the surface.

FUL'LER'S EARTH, a mineral, essentially consisting of silex and alumina, with about 24 per cent water. Like other soft aluminous minerals, it has the property of absorbing grease, and it was at one time largely employed in fulling cloth, that is in cleaning it from greasy matters, but it has been to a great extent superseded by soap.

FULL'ING (*fullo*, a fuller: *Lat.*), the art of cleansing, scouring, and pressing cloths, to make them stronger, closer, and firmer, which is done by means of a fulling or scouring mill.

FUL'MAR PETREL, a web-footed seabird, the *Procellaria glacialis* of naturalists. It is larger than a gull, possessing, like all the petrels, the singular faculty of spouting from its bill a quantity of pure oil. It abounds in northern latitudes.

FUL'MINATING POW'DER (*fulmen*, lightning: *Lat.*), a powder that explodes upon the application of certain degrees of heat or concussion, with instantaneous combustion and a loud noise. Fulminating powders are sometimes made with metals, and sometimes without. If that which is made of nitre, potash, and the flowers of sulphur, triturated in a warm mortar, is fused in a ladle, and then set on fire, it will explode with a noise like thunder. If a solution of gold be precipitated by ammonia, the product will be fulminating gold, a grain of which, if held over a flame, will explode with a sharp loud noise. But of all these explosive compounds, that which from a manufacturing point of view is the most useful, is the fulminate of mercury, now so extensively employed, mixed with a little sulphur and nitre, for charging percussion caps. Fulminating silver detonates even more powerfully than fulminating mercury.

FULMINA'TION (a thundering: *Lat.*), in Chemistry, an explosion or detonation, accompanied with a loud report. All these equally imply rapid combustion with or without flame; and the intensity of sound alone distinguishes the idea of *fulmination* from those of *detonation* and *explosion*.

FULMIN'IC A'CID, in Chemistry, the explosive constituent of fulminating mercury and fulminating silver; it is generated by the reaction of alcohol and the acid nitrates of these metals. This curious acid is composed of 4 equivalents of carbon, 2 of nitrogen, and 2 of oxygen, but all attempts to obtain it have hitherto failed.

FUMARO'LE (*Ital.*), orifices in the earth, emitting vapours of different kinds. They occur in volcanic countries.

FUMIGA'TION (*fumigo*, I fumigate: from *fumus*, smoke; and *ago*, I act with: *Lat.*), a process by means of which disinfecting vapours are diffused through the atmosphere, in order to purify apartments, goods, or articles of apparel supposed to be imbued with some contagious poisons. The most effectual agents for this purpose are chlorine and nitric acid vapour, but particularly the former.

FUNC'TION (*functio*, a performing; *Lat.*), in Algebra, any mathematical expression, considered with reference to its form, and not to the value which it receives, by giving particular values to the symbols contained in it. Thus $a + x$, and $a^2 + x^2$, are functions of x, though of different forms. In whatever way a function may be compounded of constant and variable quantities, it is a function of the variable quantities only. The calculus of functions may be considered as standing in the same relation to algebra that algebra does to arithmetic. In the calculus of functions, the generalization is carried still further than in algebra.

FUNC'TIONS (same *deriv.*), in Physiology. There are two classes of functions by which life is manifested in animals. 1. Those of animal life being functions of relation, including sensation and voluntary motion; 2. Those of vegetative life, or functions of nutrition and reproduction. The functions of the first class bring us into relation with the world around us; those of the second are necessary to the support of life and the perpetuation of the species.

FUNDS (*fundo*, I pour into: *Lat.*), the public funded debt, due by government. Money was first borrowed to meet the expenses of a war in the reign of William III., and at the beginning was obtained on the security of some tax, or portion of a tax, which was to pay the interest and principal. But, instead of paying off old loans, fresh ones were obtained, on similar securities; and at length the plan of borrowing for a fixed period, or, as it was called, upon *terminable* annuities, was given up, and most loans were made on those which were *interminable*, or until it might be convenient for the government to pay off the principal. [See DEBT, NATIONAL.] At the commencement of the system, the word *fund* signified the taxes or funds appropriated to pay off the loans obtained, and the interest arising from them; but it gradually came to mean, not the security, but the loan itself. The rate of interest at first paid by government was high; and it varied according to the abundance of disposable capital, and the public confidence. In the reign of George II., the rate of interest was fixed at *three* or *three and a half* per cent.; but to pay, for example, at the rate of four and a half per cent., government gave nearly 150*l*. of stock for 100*l*. in money: hence the present national debt amounts to about two-fifths more than the sum which was actually lent. This uniform rate of interest renders the debt more manageable, and its transfer, from sellers to buyers, more simple and convenient. Any amount may be bought in the funds, the buyer paying the interest due on it at the time of purchase, along with the price of the *stock*, as it is called, which is bought. The interest obtained by a purchaser is generally more than the nominal interest, since he rarely gives 100*l* for 100*l*. of stock. If the funds were up to *par*, that is, if 100*l*. stock would bring 100*l*. in money, it would show that money was extremely plentiful, or that profitable and safe modes of investment were very hard to be obtained. [See SINKING FUND.]

FU'NERAL GAMES (*funereus*, belonging to a funeral: *Lat.*) Among the Greeks these generally consisted of horse-races: the prizes were of different sorts and value, according to the quality and magnificence of the person that celebrated them. The garlands given to victors on these occasions were usually of parsley, which was supposed to have some particular relation to the dead. Among the Romans, the funeral games consisted chiefly of processions; but sometimes also of mortal combats of gladiators around the funeral pile.

FU'NERAL RITES (same *deriv.*), ceremonies accompanying the interment or burial of any person. These rights differed among the ancients, according to the different genius and religion of each country. The ancient Christians abhorred the pagan custom of burning the dead, and always deposited the body entire in the ground, and it was usual to bestow the honour of embalming upon the martyrs, at least, if not upon others.

FUN'GATE (*fungus*, a mushroom: *Lat.*), in Chemistry a compound of fungic acid and a base.

FUN'GIA, a genus of corals which somewhat resemble mushrooms.

FUN'GIC A'CID (same *deriv.*), in Chemistry, an acid obtained from mushrooms.

FUN'GIFORM (*fungus*, a mushroom; and *forma*, a form: *Lat.*), in Mineralogy, having a termination similar to the head of a mushroom.

FUN'GIN, the fleshy part of mushrooms, purified by digestion in hot water. It is now considered as a peculiar vegetable principle.

FUN'GUS (a mushroom: *Lat.*), in Botany, the old name of a genus of cryptogamic plants, of which the common mushroom may be taken as an example. The name *Fungi* or *Fungales* is now applied to the extensive class containing this and many allied forms. They are distinguished from Algæ by their deriving their nutriment from the substances to which they are attached, and not from the surrounding medium. They vary greatly in appearance. Some grow in living animals, or on animal substances; others on living vegetables, such as the rusts and mildews, or upon decaying vegetable matter. Some are hard and horny, others soft and fleshy. Even the yeast of beer has been pronounced to be an abnormal form of fungus. A few are edible, such as the mushroom, morel, and truffle; but the majority are poisonous. In Tierra del Fuego a fungus growing on living beech trees is a staple article of food to the savages. ——FUNGUS, in Surgery, a term applied to any morbid excrescence, whether arising from wounds, or spontaneously.

FUR, the hair of animals living in the colder parts of the globe. The furs of commerce are the dressed skins of such animals with the hair attached. Immense quantities of rough skins are annually imported, as they are well adapted for articles of clothing during winter. A great number of persons are employed in trapping the animals that yield the furs in request in the prairies and wilds of North and South America, the deserts of Africa, the steppes of Russia and Siberia, and the jungles of India. The Hudson's Bay Company had vast hunting grounds in Arctic America, where the half-savage trappers roamed in pursuit of their calling, and collected those shiploads of skins which were annually sent over here. Furs were at one time used in this country as emblems of rank. In the sumptuary laws of Henry VIII. it was ordered that no nobleman should use sable unless he was above a viscount. In the time of Edward III. only the royal family might wear ermine; and that fur under the heraldic name of miniver still denotes, on state occasions, the rank of the wearer, according to the manner in which it is worn. ERMINE is the most valuable of furs, there being a great demand for it in Europe. The SABLE ranks next to the ermine in value, and then the fur of the Silver Fox, a native of the neighbourhood of the Columbia River in Oregon. The fur is long and black, except that of a part of the back, which is white. Skins of the blue fox are much sought after, and a single specimen highly dressed has fetched forty guineas in London. Chinchilla fur is a great favourite with ladies, from its extreme softness. It is obtained from a small rodent animal, a native of South America. Many other furs are imported, such as those of the mink, several species of marten, and the glutton, all animals allied to the weasel; the wild cat; several species of fox, including the black fox, which has a white tipped tail (for a very fine skin as much as 100*l*. have been given), and the red fox, with a bright fur much prized by the Turks. Even the skins of monkeys are imported for their handsome fur.

FUR'LONG (*furlang*: *Sax.*), a measure of length equal to one-eighth of a mile, or forty poles. It is also used in some law-books for the eighth of an acre.

FUR'LOUGH (*urlaub*: *Ger.*), leave granted to a non-commissioned officer or soldier to be absent for a given time from his regiment.

FUR'NACE (*fornax*, a vault: *Lat.*), an apparatus for melting metals, &c., variously constructed, according to the use for which it is intended. It consists of a suitable fire-place, and receptacles to contain the substances to be operated upon; and is sometimes supplied with a dome, so as to reverberate the heat and flame. [See FOUNDRY.]

FUSE or **FUZE** (*fusée*: *Fr.*), a small tube, filled with combustible materials, by which fire is communicated to the powder in a bomb, &c. As its contents burn slowly, time is given, before the charge takes fire, for the bomb to reach its destination. It is used also in mining, &c., but has, in a great degree, been superseded by the use of a galvanic current in producing ignition.——FUSEE, in Watchwork, the conical piece round which the chain of a clock, watch, &c., moved by a spring, is wound. It is of varying diameter, acting with least power when the watch, &c., is first wound up, that is, when the spring is strongest, and with most when the watch, &c., has run nearly down, that is, when the spring is weakest; and thus the power applied to the watch, &c., is rendered nearly uniform. The speed with which the spring uncoils to produce a given effect, and by consequence the quantity of chain unwound from the fusee, are constantly varying, since, in accordance with a well-known mechanical law, what the spring wants in power it must make up in velocity, and *vice versâ*.

FU'SEL OIL (*fusel*, impure spirit: *Ger.*), an acid volatile oil, found in the crude spirit manufactured from potatoes and grain. It exhales a powerful and suffocating odour. It is supposed to be a product of the fermentation of sugar. When purified it is styled by chemists the hydrated oxide of amyl.

FUSI'L (*Fr.*), a light musket, similar to a carbine, but better finished: it was formerly used by officers in light companies, and has given its name to several regiments.——In Heraldry, a bearing of a rhomboidal figure, more slender than a lozenge, its upper and lower being more acute than its middle angles.

FUSILEE'R (*fusilier*: *Fr.*), a soldier belonging to what is termed the light infantry. One of the regiments of Life-guards is known as the Fusileers. They are distinguished by the white cockade.

FU'SION (*fusio*: *Lat.*), the liquefaction of a solid body by means of heat; as in the case of metals, glass, and similar bodies. Those substances which admit of being fused are termed *fusible*, but those which resist the action of fire or heat are termed *refractory*.——AQUEOUS FUSION, the melting of a salt in its water of crystallization; the resulting liquid is a saturated hot solution.

FUS'TIAN (*futaine*: *Fr.*), a kind of coarse thick twilled cotton, of which velveteen, corduroy, and thick-set are varieties.——In Literature, an inflated style of writing in which high-sounding and bombastic terms are used, instead of such as are natural, simple, and suited to the subject.

FUS'TIC, the wood of a species of mulberry (*Morus tinctoria*), a large tree growing in North and South America, and the West India Islands. It is very extensively used as an ingredient in the dyeing of yellow, for which purpose large quantities of it are annually imported. There is another kind, called Zante, or *young* fustic, obtained from the *Rhus Cotinus*, a small shrub of the sumach genus. This imparts a beautiful bright yellow dye to cottons, &c., which, when proper mordants are used, is very permanent.

FUT'TOCKS (corrupted from *foot-hooks*), in Naval Architecture, the lower timbers raised over the keel that hold the ship together. The small shrouds in a ship's rigging, passing from the mainmast, foremast, and mizenmast shrouds, to those of the topmast, are termed *futtock shrouds*.

G

G, the seventh letter in the English alphabet; but in the Greek and all the oriental languages, it occupies the third place. It is a mute, and cannot be sounded without the assistance of a vowel. It has a hard and a soft sound, as in *game* and *gesture*; and in many words, as in *sign*, *reign*, &c., the sound is not perceived. As an abbreviation, it stood for *Genius*, *Gens*, *Gaudium*, &c. G.V. signified *Genius urbis* (the genius of the city); G.L. *Genius loci* (the genius of the place); G.P.R. *Gloria populi Romani* (the glory of the Roman people). With us it stands for *Grand*, *Garter*, *Gratiâ*, &c., as G.C.B. *Grand Cross of the Bath*; K.G. *Knight of the Garter*; D.G. *Dei gratiâ* (by the grace of God); &c. As a numeral, it formerly stood for 400, and, with a dash over it, for 400,000. On French coins, it indicates the city of Poitiers.——In the Calendar, it is the seventh Dominical letter.——In Music, it is the nominal of the fifth note in the natural diatonic scale of C, and to which Guido applied the monosyllable *sol*. It is also the name of the highest or treble clef.

GA'BIONS (*Fr.*), in Fortification, baskets made of osier-twigs, of a cylindrical form, six feet high and four wide, which, being filled with earth, serve as a shelter from the enemy's fire.

GAB'RONITE (*gabro*, a rock consisting of diallage and felspar: *Ital.*), a silicate of alumina, soda, and potash, found in a vein of titaniferous iron, near Arendal, in Norway. It has also been termed *fuscite* and *compact scapolite*.

GAD (a club: *Sax.*), among miners, a tool in the form of a pointed wedge, having its sides of a parabolic figure.

GAD'FLY, the *Œstrus Bovis*, a dipterous insect, which deposits its eggs on the backs of oxen, where it raises a tumour called *worble* by farmers. Another species lays its eggs in the nostrils of the sheep, whence the larvæ climb up into the interior of the head, where they feed. A third species deposits its eggs amongst the hairs of the horse's hide. The animal licks the part, and the larvæ are hatched in the mouth, whence they pass into the intestines, and form the well-known Bots. [See BREEZE-FLY.]

GAD'OLINITE, a mineral, containing yttria and oxide of cerium, found almost exclusively in Sweden, and named after Gadolin, its discoverer.

GA'DUS, in Ichthyology, a genus of malacopterygian fishes, containing the common cod-fish, *Gadus morrhua*, the whiting, *G. merlangus*, the haddock, *G. æglefinus*, the coal-fish, *G. carbonarius*, the pollack, *G. pollachius*, and other less known species.

GAE'LIC, or ERSE, that dialect of the ancient Celtic language which is spoken in the highlands of Scotland. It is a commonly received opinion, that the Celtic, at the time of the Roman invasion, was universally spoken over the west of Europe; for all its numerous dialects show the clearest proofs of a common origin. The languages at present known to be certainly of the Celtic stock are the Welsh, the Bas-Breton or Armorican, the Irish, the Erse or Gaelic, the Manx, and the Cornish. The Scotch and Irish dialects are almost identical The Gaelic, which, from a variety of causes, has retained much of its original purity, is bold, expressive, and copious. It derives no assistance from the language either of Greece or Rome, from which it differs in its structure and formation. More than two-thirds of the names of places in Great Britain and Ireland are of Celtic origin, which, if other proofs were wanting, would establish the fact of its once having been the language of the country.

GAFF (*gaffe*, a harpoon: *Fr.*), in Nautical language, a sort of boom or pole, used to extend the upper edge of sails, as the mainsail of a sloop, &c.

GAGE or GAUGE (*jauger*, to measure: *Fr.*), an instrument for making measurements of different kinds.——GAGE, an apparatus for measurements of various kinds. Thus, a *sliding gage*, used by mathematical instrument makers for measuring and setting off distances; a *tide-gage*, for determining the heights of tides; a *wind-gage*, an instrument for measuring the force of the wind on any given surface, &c.

GAIL'LIARDE (*Ital.*), an ancient Italian dance, of a sportive character and lively movement. It was sometimes called a *Romanesque*, because it was said to have come originally from Rome.

GAL'AXY (*galaxias*, from *gala*, milk: *Gr.*), in Astronomy, the *Via lactea*, or *Milky Way*; a long, white, luminous track, which seems to encompass the heavens like a girdle, forming nearly a great circle of the celestial sphere. This, like most other phenomena of nature, has suggested some beautiful ideas to the poet. The invention of the telescope has confirmed the conjecture of the earlier astronomers that it consists of a multitude of stars, too remote to be separately distinguished by the naked eye, but scattered in millions on the dark ground of the general heavens. We are indebted to the labours and researches of the Herschels for most of the knowledge we possess regarding the milky way. It is thought that the vast collection of stars which surround us on every side, and of which our sun is one, is shaped like a flat circular zone, or thin slice of a sphere. This disc-like cluster is divided through one-third of its whole extent into two arms. When we look upon the milky way, we must be supposed to be looking towards the edge of the disc, that is, the thickest portion of our stellar universe, but in other directions the stars glitter distinct from each other, because then we are looking upon the thinnest portions of the cluster. In many parts of the milky way, the most powerful telescopes seem to perceive the farthest stars upon a black starless ground, but in others there are masses and clouds of stars which the best telescope cannot resolve.

GAL'BANUM (*Lat.*), in Medicine, a fœtid gum-resin, the produce of a Persian umbelliferous plant, the *Opoidia galbanifera*, and perhaps of other umbellifers.

GAL'BULUS (cypress fruit: *Lat.*), in Botany, the fleshy fruit of the Junipers, trees belonging to the coniferous order.

GALE'NA (*Lat.*), in Mineralogy, the native sulphuret of lead, obtained both in masses and crystallized. It occurs in primitive and transition mountains, but is more frequently found in secondary rocks, especially in compact limestone. It constitutes beds and veins, and is found more or less in every country. In England it is very abundant, and it is also widely diffused over the United States of America. Most of the lead of commerce is procured from galena, and usually contains a little silver. [See LEAD.]

GALEN'IC, in Medicine, that mode of treating disease which is founded upon the principles of Galen, or which that physician introduced.——*Galenical medicines*, those that are formed by simple means from vegetables, as by infusion or decoction, &c.; while the *chemical*, to which they are opposed, are those produced by extracting the more active principles by elaborate processes, as by calcination, digestion, fermentation, &c.

GALL (*galle: Sax.*). [See BILE.]

GALL'-BLADDER (same *deriv.*), a membrane situated in the concave side of the liver. Its use is to collect the bile, first secreted in the liver, and, mixing it with its own peculiar product, to elaborate it further; to retain it for a certain time, and then expel it as it is required.

GALL'-FLY. [See CYNIPS.]

GALL'-NUT, a protuberance or tumour produced by the puncture of gall-flies, species of the hymenopterous genus *Cynips*, on plants and trees of various kinds, but more particularly on the oak. The fly punctures the surface of a leaf, bud, or stalk, and deposits an egg in the interior, along with a drop of an irritating fluid: in the course of a few days, an excrescence is thrown out, affording nourishment to the young insect, and protecting it from external injury until it has attained its full size, when, after having undergone metamorphosis, it eats through the excrescence, and escapes into the open air.

GALL'-STONES, calculous concretions frequently formed in the gall-bladder, and sometimes occasioning great pain during their passage through the ducts into the *duodenum*, before they are evacuated.

GAL'LEON (*galeon: Fr.*), ships of war formerly used by the Spaniards and Portuguese. In more recent times, those vessels were called *galleons*, in which the Spaniards transported treasure from their American colonies.

GAL'LERY (*galerie: Fr.*), in Architecture, a long narrow room, the length of which is at least three times as great as its breadth, by which proportion it is distinguished from a *saloon*. Corridors also are sometimes called galleries. Since a gallery is generally decorated with paintings, in oil or fresco, a large collection of pictures, even if contained in several adjoining rooms, is called by that name.——GALLERY, in Fortification, a walk across a ditch in a besieged town, made of strong planks, and covered with earth. It was formerly used for carrying a mine to the foot of the ramparts.——GALLERY, in Mining, a narrow passage, or branch of a mine, carried under ground to a work intended to be blown up ——GALLERY, in Shipbuilding, a balcony, projecting from the stern of a ship of war, or of a large merchantman.

GAL'LEY (*galère: Fr*), a kind of low, flat-built vessel, furnished with one deck, and navigated with sails and oars, found chiefly in the Mediterranean.——An open boat used on the Thames by custom-house officers, &c.——The cook-room or kitchen of a ship.——The war galleys, or *naves longæ*, of the Romans, were variously named from their rows or banks of oars.——GALLEY-SLAVE, a person condemned to work at the oar on board a galley, being chained to the deck.——In France, the galleys, in which the convicts labour and are confined, resemble the *hulks* of Great Britain.

GAL'LIC A'CID, in Chemistry, an acid which forms one of the astringent principles of plants. It is obtained by the oxydation of tannic acid, or tannin, which abounds in nut-galls, oak bark, &c. It is slightly acidulous and styptic to the taste, but inodorous; and crystallizes in white silky needles, which are soluble in boiling water or alcohol. Its constituents are carbon, hydrogen, and oxygen. When an infusion of galls is dropped into a solution of sulphate of iron, it produces a deep purple precipitate, which becomes black by exposure to the air. It is a very long time in subsiding, and, in writing-ink, is retained in suspension by mucilage.

GAL'LICAN CHURCH, the distinctive title of the Roman Catholic church in France, which, in opposition to *ultramontanism*, long maintained a certain degree of independence with regard to the see of Rome. The *liberties* of the Gallican church were first asserted in the pragmatic sanction, in 1438, but were defined and confirmed in 1682. It was then decided that the pope has no temporal power in France, and only a spiritual power limited by canons and councils, and that the decisions of the holy see are subject to reversal by the body of the clergy.

GAL'LICISM (*Gallus*, a Frenchman: *Lat.*), an idiom or phrase, of the French language, introduced in speaking or writing another language.

GALLI'NÆ (*gallina*, a hen: *Lat.*), in Ornithology, the order of birds under which are comprehended the peacock, pheasant, turkey, partridge, grouse, domestic cock, &c.

GAL'LIOT (*galliotte: Fr.*), a small galley or Dutch vessel, used in former times. It carried a main and mizen mast, and a large gaff-mainsail; but was built very slightly, and was designed only for chase. It could both sail and row, and had sixteen or twenty oars: all the seamen on board were soldiers, and each had a musket by him as he sat at his oar

GAL'LON, a measure of capacity both for dry goods and liquids, holding four quarts The imperial gallon contains 10 lbs. avoirdupois of distilled water, equivalent to 277,274 cubic inches. The old English gallon, wine measure, contained 231 cubic inches; and the old gallon, beer measure, 282

GALLOO'N (*galon: Fr.*), a narrow thick kind of ferret, or lace, used to edge or border cloths

GALLOPA'DE (*galoper*, to gallop: *Fr.*), in the manège, a sidelong or curvetting kind of gallop. Also the term for a sprightly and active kind of dance.

GALLS, local diseases of plants, caused by the puncture of insects in depositing their eggs. They are produced by concentric layers of dried sap, and do not affect the general health of the tree.

GAL'VANISM, the development of electrical phenomena without the aid of friction, and by means of a chemical action which takes place between certain bodies. It derived its name from Galvani, a professor at Bologna, who, in a course of experiments on animal irritability, observed the first striking phenomena that led to its discovery, which occurred in the following manner. One of his assistants happened to bring the point of his scalpel to the crural nerves of a skinned frog lying near the electrical conductor, upon which the muscles of the limb were agitated with strong convulsions. After this, he continued his experiments in various ways, and ascertained that the mere agency of metallic substances, provided they were dissimilar metals, would produce such convulsions. This subject engaged the attention of experimentalists both before and after the death of Galvani, which happened in 1798; but none added anything of great importance to Galvani's discovery except Volta, who repeated his experiments, and found that whenever two pieces of metal of different kinds were placed in different parts of an animal, and were brought either into contact, or into connection by means of a metallic arc, convulsions ensued, and that this effect was strongest when the metals were zinc and silver, particularly when several pairs of the metals, having pieces of moist cloth between them, were employed. This led him to the construction of an apparatus for the purpose of accumulating electricity, which has since been called the *Galvanic battery* or *Voltaic pile*. Several improvements upon the voltaic pile were soon made by other philosophers; and the discoveries in galvanism multiplied with a rapidity, and to an extent, surpassing anything before known in the history of science. It has been ascertained that chemical action is indispensable to the production of galvanic electricity. The least complicated galvanic arrangement is termed *a simple galvanic circle*. It consists of three conductors, of which one at least must be solid, another fluid, and the third may be either solid or fluid. This is possessed but of feeble powers, yet they are often sufficiently striking. *Compound galvanic circles*, or *galvanic batteries*, are formed by multiplying those arrangements which compose simple circles. [See BATTERY, GALVANIC.]——*Chemical effects of Galvanism.* The most simple chemical effect of the galvanic battery is the ignition and fusion of metals; the facility with which the different metals are ignited, being inversely proportional to their power of conducting heat. Hence platina, which has the lowest conducting power, is most easily ignited; and silver, which conducts heat with greater facility than any other metal, is the most difficult to be ignited. The most striking effect of the voltaic battery, however, is the intense light which is produced by placing two pieces of charcoal, cut into the shape of pointed pencils, at the two ends of the wires of an interrupted circuit. When the battery is very powerful, and the charcoal points are brought within the thirtieth or fortieth of an inch of each other, a bright spark is produced. By withdrawing the points from each other, a constant discharge takes place, through the heated air, in a space of from one to four or more inches, according to the energy of the apparatus, producing a most brilliant arch of light, of considerable breadth, and in the form of a double cone. Platina, introduced into this arch, melts as wax does in the flame of a candle: and the light equals the brilliancy of the sun. But decomposition is the most important chemical effect of galvanism. The substance first decomposed by it was water. When two gold or platina wires are connected with the opposite poles of a battery, and their free extremities are plunged into the same cup of water, but without touching each other, hydrogen gas is disengaged at the negative wire, and oxygen at the positive. By collecting the gases in separate tubes, as they are liberated, they are found to be quite pure, and in the exact proportion of two measures of hydrogen to one of oxygen. In decomposing water or any other compound, the same element is always disengaged at the same side of the battery; so that the elements which collect around each pole have a certain analogy: inflammable bodies, alkalis, and earths, go to the negative pole, while oxygen and acids go more to the positive. Hence the terms *electro-positive* and *electro-negative*. It is also found that not only are the elements of a compound fluid conveyed, by galvanic energy, to the opposite poles situated in distant parts of the containing vessel, without the movement of these elements being perceptible; but that they may even be evolved in separate portions of the fluid placed in distinct vessels, and connected only by some slight link, as a few fibres of moist cotton or amianthus. Many phenomena, indeed still more extraordinary, present themselves in connection with these interesting experiments. The elements of compound bodies are actually conveyed, by the influence of the electric current, through solutions of substances on which, under other circumstances, they would have exerted an immediate and powerful chemical action, without any such action being produced. [See ELECTRICITY, MAGNETISM, and VOLTAIC ELECTRICITY.

GALVANI'ZED IRON, the commercial name of iron coated with zinc, to prevent rust.

GALVANOM'ETER (*galvanism;* and *metron*, a measure: *Gr.*), an instrument for measuring minute quantities of electricity, or the operations of galvanism. It consists of one, and sometimes more, delicate magnetized needles, suspended horizontally by some very slender fibre, and surrounded by a great number of coils of very thin insulated copper wire. When the electric current to be examined is transmitted through the wire, the needle is deflected in a direction, and to an extent, dependent on the direction and intensity of the current. [See ELECTRO-MAGNETISM.]

GA'MBIT, at Chess, a word derived from an Italian phrase used in wrestling, and signifying a tripping-up. The player who opens the game places a pawn in such a position that it can be taken by the adversary in order to give freedom of movement to his superior pieces. There are several gambits, known to chess players by different names.

GAMBO'GE (*Gambodia*, in India, whence it was first brought), a gum-resin, the inspissated juice of various species of *Garcinia* trees belonging to the nat. ord. *Guttiferæ*, and growing in the East Indies, Ceylon, &c. It is obtained in commerce in masses of a dull orange colour, possessing no smell, and a slightly acrid taste; and affords a beautiful yellow colour, much used by painters. Its medicinal properties are violently cathartic.

GAME LAWS (*gaman*, to sport: *Sax.*

Any person taking out a proper certificate may kill game on his own land, or that of another with his leave; and anyone having such a certificate may sell game to any person licensed to deal in it. Any person, in the actual possession of enclosed lands, or the owner of them, if he has the right of killing game on them, may by himself, or any one authorized by him in a certain form of writing, take, kill, and destroy hares, without paying duty or obtaining a certificate.

GAMES (same *deriv.*), in Antiquity, public diversions, or contests, exhibited on certain occasions as spectacles for the gratification of the people. Such, among the Greeks, were the Olympic, Pythian, Isthmian, and Nemæan games; and, among the Romans, the Apollinarian, Circensian, Capitoline, &c. The Romans had three sorts of games, viz. sacred, honorary, and ludicrous. The first were instituted in honour of some deity or hero. The second were those exhibited by private persons, to please the people; as, the combats of gladiators, the scenic games, and other amphitheatral sports. The ludicrous games (*ludus*, a sport: *Lat.*) were much of the same nature with the games of exercise and hazard among us: such were the *ludus Trojanus tesseræ*, &c. By a decree of the Roman senate, it was enacted that the public games should be consecrated, and united with the worship of the gods; whence it appears, that feasts, sacrifices, and games made up the greatest part, or rather the whole, of the external worship offered by the Romans to their deities.

GAMOPET'ALOUS (*gamos*, union; *petalon*, a leaf: *Gr.*), in Botany, an epithet given to a corolla with the petals united; monopetalous.

GAM'UT or GAM'MUT, in Music, the table or scale of notes laid down by Guido, and marked by the monosyllables *ut, re, mi, fa, sol, la*, &c., derived from syllables commencing the lines of one of the hymns of St. John the Baptist, in the Roman breviary, '*Ut* queant laxis *re*sonare fibris *mi*ra gestorum *fa*muli tuorum,' &c.; *ut* has been changed for *do*, as more convenient for singing.

GANG (*gangan*, to go: *Sax.*), in seamen's language, a select number of a ship's crew appointed on any particular service.

GANG'LION (*ganglion*, a knot: *Gr.*), an enlargement in the course of a nerve. Also, a tumour in the sheath of a tendon.

GAN'GRENE (*gangraina*, from *gnao*, I gnaw: *Gr.*), in Medicine, the first stage of mortification before the vitality of the part is completely extinct: when the part is altogether dead, it is termed *sphacelus*.

GAN'GUE, in Mining, the mineral substances which contain the ore of a metal, or are mingled with it without being chemically combined.

GANG'WAY, among seamen, the name of several ways or passages from one part of a ship to another; but it is especially applied to a range of planks laid horizontally along the upper part of a ship's side from the quarter-deck to the forecastle, and fenced on the outside by iron stanchions, and ropes, rails, or netting.—*To bring up to the gangway* is to punish a sailor by flogging him there.

GAN'NET, or *Solan Goose*, the *Sula alba* of ornithologists, a palmiped bird, about the size of a common goose, with a bill six inches long, jagged at the sides, and straight almost to the point, where it inclines downwards. The plumage in the young bird is dark with white spots; when mature it is white. Gannets are found in the north of Scotland, Norway, Newfoundland, and many other places; but they abound to an almost incredible extent in the Hebrides and other solitary islands of North Britain, where, in the months of May and June, it is difficult to walk without treading on their eggs, which are a source of considerable profit to the inhabitants.

GANOID (*ganos*, brilliancy: *Gr.*). In Ichthyology, those scales which are covered with a coat of enamel are termed ganoid. Many fossil fishes had scales of this nature.

GANT'LET or GAUNT'LET (*gantelet*: *Fr.*) a large kind of glove, made of iron, the fingers being covered with small plates: it was formerly worn by cavaliers, armed at all points.—*To throw down the gantlet* is a phrase signifying to challenge or defy. The expression derives its origin from the days of chivalry, when he who challenged an opponent in the lists threw down his glove, and he who accepted the challenge took it up.

GANT'LOPE (*gant*, all; and *loopen*, to run: *Dan.*), or GANT'LET, an old military punishment, in which the criminal, running between the ranks, received a lash from every man. A similar punishment is used on board ships: but it is seldom inflicted, except for such crimes as are calculated to excite general disgust among the seamen.

GAOL DELIVERY, a term in law for the clearing of a prison by a judicial trial of the prisoners; also a commission from the king to deliver or clear the gaols.

GAR'DENING (*garten*, a garden: *Ger.*), that branch of cultivation which teaches how to dispose fruit-trees, flowers, and herbs, to the best advantage, whether for profit or pleasure; and how to prepare the soil for sowing the different kinds of seed; as well as how to treat the plants during their various stages of vegetation, till they arrive at maturity. The subject is divided into *Horticulture*, which relates to the cultivation of culinary vegetables and fruits; *Floriculture*, which relates to the cultivation of ornamental and rare flowers, shrubs, and trees; *Arboriculture*, which relates to the cultivation of trees and shrubs used for various purposes in the arts and general economy; and *Landscape gardening*, or the general arrangement of the scenery or landscape about a country residence. We may perceive from ancient authors that the formation of beautiful gardens very early attracted the attention of the polished nations of antiquity; but the art seems to have been forgotten amid the desolation caused by the irruption of barbarous hordes into the provinces of the Roman empire. When the taste for ornamental gardening revived, it was corrupted; stiffness was mistaken for beauty, and regularity was carried to an extravagant excess. This was succeeded, among ourselves, by the opposite extreme. A gardener should study nature not less than the painter; but it is not necessary that he should avoid exhibiting any traces of art. Above all things, the style of the garden should be suited to that of the dwelling it is intended to adorn.

GAR'-FISH (*gar*. a lance: *Sax.*), in Ichthyology, the *Sea needle*, a long slender fish, with the jaws projecting into an elongated beak. It is the *Belone vulgaris* of naturalists. The head and back are a dark green, the sides paler, and the belly of a bright silvery colour. It makes its appearance on the English coast just previous to the arrival of the mackerel, which it resembles in flavour.

GAR'LIC (*gar*, a lance: *Sax.*; and *leek*), the *Allium sativum* of botanists, a plant with a bulbous root, consisting of many small tubercles included in its coats. It has a strong smell and an acrid taste, but is much used as a condiment.

GAR'NET (*granat*: *Ger.*), in Mineralogy, a precious stone of great beauty, usually occurring in crystals more or less regular, and having numerous sides. It is a silicate of alumina with oxide of iron: when extremely fine, it has been sold for ruby. Its prevailing colour is red of various shades, but it is often brown, and sometimes green, yellow, or black. *Precious garnet* is always red: fine specimens are found in Ceylon, Pegu, Brazil, &c.; and the term *oriental* sometimes applied to it indicates not a locality where it is found, but its excellence. Garnets are usually disseminated, and occur in all the primitive strata from gneiss to clay slate. In some parts of Germany, they are so abundant as to be used as fluxes for iron ores; in others, the garnet gravel is washed, pounded, and employed as a substitute for emery. Varieties have the names of the *precious* or *oriental*, the *pyrope*, the *topazolite*, the *melanite*, the *grossular*, the *pyreneite*, and the *colophonite*.

GAR'TER, ORDER OF THE, a military order of knighthood of ancient institution. Its origin and name have been often discussed. One tradition runs that it was instituted by Richard I. at the siege of Acre, where he caused twenty-six knights, who firmly stood by him, to wear thongs of blue leather about their legs. Another account attributes its origin to Edward III., when he picked up at a court entertainment the countess of Salisbury's garter, and rebuked the laughing bystanders by the words, 'Honi soit qui mal y pense,' words adopted as the motto of the order. Previous to the reign of Edward VI. it was generally called the order of St. George. The number of knights was originally twenty-six, and it has never much exceeded this number. Princes of the blood are added as supernumeraries, and special statutes are occasionally made for the admission of foreign potentates, and even of British subjects in excess of the ordinary number. The king or queen is sovereign of the order, of which about 60 foreign crowned heads have been members. This order is never conferred but upon persons of high rank. The habit and ensigns are, the garter, mantle, cap, and collar. The badge of the order is the image of St. George, called the George: and the motto is *Honi soit qui mal y pense*, or 'Evil be to him that thinks evil hereof.' The bishop of Winchester is the prelate of the order, and the bishop of Oxford the chancellor.

GAS (*gaz*, from *geist*, a spirit: *Ger.*), a general term employed in chemistry to express all permanently elastic aerial fluids, whether produced by chemical experiments or evolved in natural processes. Four of the elementary bodies are gases, viz. oxygen, hydrogen, nitrogen, and chlorine. Each species has its distinguishing characters and its own peculiar and uniform specific gravity, or weight, though, in all cases, several hundred times less than that of water. Gases possess many extraordinary properties, and play an important part in almost all chemical, and in many natural phenomena. [See the different gases under their respective names.] One of the properties of gases is, that if two or more are confined together, and the circumstances are such that they will not combine with each other, they will mix and interfuse although their specific gravities may be very different. Gases are highly elastic. According to Boyle's law (often attributed to Marriotte), the volume of a gas is inversely as the pressure, whilst the density and elastic force are directly as the pressure, and inversely as the volume. Thus a cubic foot of gas under a pressure of thirty inches of mercury will expand to two cubic feet if the pressure be reduced to one half. But if the pressure be doubled, the gas will only occupy half a cubic foot. The density of a cubic foot of gas will be doubled if the volume be reduced by pressure to one half, and halved if the diminished pressure allows the gas to expand to the volume of two cubic feet. The elastic force or tension follows the same rule. It is known that the elasticity of nearly all gases can be so far counteracted by great pressure that they will become liquid. The common process is to expose them to the pressure of their own atmospheres. Thus, carbonate of soda and sulphuric acid, mixed together in a perfectly close vessel, generate carbonic acid gas, which soon not only fills the vessels, but becomes condensed by the mutual pressure of its own particles. *Liquid* carbonic acid is highly volatile, and therefore, by the rapid expansion and evaporation consequent upon its issue from a receiver, is capable of producing a temperature so low as 189° below the freezing point of water. The solid carbonic acid which is produced, cold as it is, may be held in the hand with impunity, or retained in glass in the open air for a considerable time, because it immediately becomes surrounded with its own vapour, and is not in contact with the substance upon which it apparently rests. In order, therefore, to use the liquefied gas as a cooling agent, it must be brought into contact with another substance of a very different temperature, by means of a third, which should be a good conductor of heat. Ether is used for this purpose, because it will bear their contact and still retain its liquid state. Now, although the carbonic acid thus dissolved is not so cold as solid carbonic acid, if the finger is placed in it, the effect will be the same as if it were plunged in melted metal.

GAS FOR ILLUMINA'TION. When treating of carburetted hydrogen, we alluded to the constituents of gases for illumination. The substance most ordinarily used for the production of these is bituminous coal; and the gas obtained from it is a mixture of two or more gases or vapours, with small portions of other gaseous bodies, particularly hydrogen and carbonic oxide. Dr. Clayton, about the year 1735, examined the fitness of coal gas for the production of artificial light; but its application to economical purposes was unaccountably neglected for about sixty years after. At length, in 1798, Mr. W. Murdoch, in the employment of Messrs. Watt and Boulton, of the Soho foundry, erected a gas apparatus on a large scale at the foundry. In 1803, Mr. Winsor exhibited gas illuminations in the Lyceum, London; and proved the practicability of lighting the streets of cities by lighting Pall Mall. Since that time, gas has been more extensively employed every succeeding year, till at length almost all factories, and even the smaller towns, are lighted by it. So great, indeed, were the advantages which the public derived from this brilliant light, that, in less than twenty years from Mr. Winsor's experiments in Pall Mall, there were four large gas companies established in the metropolis. In 1852, there were eighteen public companies in London, each having gas works; which supplied gas for 134,300 private, and 30,400 street-burners. About 890 tons of coal were consumed daily; 7,120,000 cubic feet of gas were used in the longest night; 408,000 tons of coal were used during the year; and the product of gas was 4000 millions of cubic feet. When coal is subjected to destructive distillation, that is, raised to a red heat in closed vessels, it yields permanent gases, vapours condensible into the liquid or solid state by cooling, and solid matter as residuum. These must, in the manufacture of coal gas, be separated. For this purpose, the coal is placed in cast-iron retorts, which communicate by pipes with the *hydraulic main*, a large horizontal pipe, partially filled with tar and ammoniacal liquor, into which the pipes from the retorts dip. This hydraulic main condenses the more volatile vapours into a liquid, which runs off by an overflow-pipe. The gas passes into the purifiers, where the carbonic acid and sulphuretted hydrogen are removed by a mixture of lime and water; thence it is conducted into the gas-holders, or, as they are improperly called, gasometers where it is stored up for use. In order to obtain a good gas from coals, the distillation should commence with a retort previously heated to a cherry-red, which heat should be steadily continued during the whole process, that is, from five to eight hours; but the operation should be stopped some time before gas ceases to come over, lest compounds having feeble illuminating power should impoverish the contents of the gasometer.——OIL GAS contains no mixture of sulphuretted hydrogen, and requires no other purification than transmission through a refrigerator; and as less of it is required for any given quantity of light, the atmosphere of a room is less heated and contaminated by its combustion. It is, however, considerably more expensive than the gas from coal; although the first outlay of capital for a manufactory upon a large scale is less, on account of the smaller size of the necessary pipes and apparatus. Oil gas is obtained by dropping fish oil, and substances not fit for lamps, on iron, coke, or bricks, raised to a high temperature. One cubic foot of oil produces from 600 to 700 cubic feet of gas, or, on an average, 98 per cent. by weight. When resin is used for the production of gas, it must first be rendered fluid by solution in oil of tar, &c. One pound of resin yields from 14 to 23 cubic feet of gas.——WOOD GAS. Gas obtained by the destructive distillation of wood has been tried; but it totally failed on account of the feeble illuminating power which it possesses.

GAS-BURNERS, either simple beaks of metal perforated with a small round hole, or a circle with a series of holes which form an argand flame; or two holes drilled obliquely, to make the jets cross each other, so as to form a flame like a swallow's tail; or a slit which produces a sheet of flame, and is used with most of the street lamps. The burners are mounted with a stop-cock for regulating the supply of gas.

GAS-METER. Before the gas is consumed it is usually passed through an instrument called a *meter*, in order to ascertain the number of cubic feet which are used in a given time, or in a particular place. The instrument consists of a kind of revolving drum, having compartments which measure the gas, and deliver it, as they pass round in succession; water, which, before the next revolution, is replaced by gas, taking its place. It is filled with that fluid up to a certain height through an orifice in the side of the vessel, in which a plug is fitted. The gas enters by a pipe at one side, escapes from an orifice into a pipe at the other, and is thence conveyed to the burners. By means of a train of wheel-work in connection with the axis of the drum, an index is turned, which points out on the index-plate how many cubic feet have passed through the meter.

GASOM'ETER, or more correctly GASHOLDER, a hollow cylindrical vessel, usually made of metal plates, open at one end, and placed upon its open end in a cistern, or a cylindrical ring of water. It serves not merely as a magazine for receiving the gas when it is purified, and keeping it in store for use, but also for communicating to the gas, in the act of burning, such a uniform pressure as may secure a steady unflickering flame.

GAS'TRIC JUICE (*gastēr*, the stomach; *Gr.*), in the animal economy, a thin pellucid liquor, separated by the capillary exhaling arteries of the stomach. It is the principal agent in digestion; for it acts with a chemical energy in dissolving food, which is not merely reduced by it to very minute parts, but its taste and smell are quite changed, and it acquires new and very different properties. [See DIGESTION.]

GASTRI'TIS (same *deriv.*), in Medicine, inflammation of the stomach. It is attended by great irritability of that organ, hiccough, vomiting, and violent pain, with general uneasiness, and a small hard pulse. There is also fever, accompanied with prostration of strength. It is a very dangerous disease.

GASTROR'APHY (*gastēr*, the stomach; and *raphē*, a seam: *Gr.*), in Surgery, the operation of sewing up wounds of the abdomen.

GASTROT'OMY (*gastēr*, the stomach; and *tomē*, a cutting: *Gr.*), in Surgery, the operation of cutting into or opening the abdomen.

GA'UGING-ROD (*jauger*, to gauge: *Fr.*), an instrument used in measuring the contents of casks or vessels.

GAULT, a bed of fossiliferous clay, having an average thickness of 100 feet, which forms the lowest member of the upper cretaceous group in the south of England. It is interposed between the upper and lower green sand, and contains a great number of well preserved marine shells. It was originally fine mud deposited in a deep sea.

GAUZE (*gaze: Fr.*), a very thin, slight, transparent kind of woven stuff, sometimes of silk, and sometimes only of thread. It is frequently enriched with flowers of silver or gold.

GAV'EL-KIND (*gyfe*, give; *eal*, all; and *kyn*, kind: *Sax.*), a tenure or custom by which the lands of a father, dying intestate, are divided equally at his death among his sons; and the land of a brother, dying without issue, descends equally to his brothers. And though the ancestor be attainted and hanged, the heir succeeds without any escheat. This species of tenure prevailed in England, before the Norman conquest, in many parts of the kingdom, if not through the realm; but particularly in Kent, where it still exists, in consequence, as is affirmed, of the Kentish men having submitted upon the express condition of retaining their peculiar privileges.

GAVOT' (*gavotte: Fr.*), a kind of dance, the air of which has two brisk and lively strains in common time, each of which is played twice over.

GAZEL'LE or GAZ'EL, a member of the antelope tribe, the *Gazella Dorcas* of naturalists. It is a native of the north of Africa and Asia Minor. Like the goat, it has hollow permanent horns, and it feeds on shrubs; but in size and delicacy, and in the nature and colour of its hair, it resembles the roebuck. The beauty and brilliancy of its eye is its most remarkable feature.

GAZET'TE, a kind of official newspaper, containing an account of public or private transactions and events, which are deemed sufficiently important for insertion. *Gazetta* is said to have been the name of a Venetian coin, in value between a farthing and a halfpenny in England, which was the price of the first newspaper; and hence the name. The first gazette in England was published at Oxford in 1665. On the return of the court to London, the title was changed to the *London Gazette*. It is now the official newspaper, and is published on Tuesdays and Fridays.

GAZETTEE'R, a topographical work, containing brief descriptions, alphabetically arranged, of empires, kingdoms, cities, towns, and rivers. It may either include the whole world, or be limited to a particular country. The first work of this kind, with which we are acquainted, is that of Stephen of Byzantium, who lived in the beginning of the 6th century.

GA'ZONS (*Fr.*), in Fortification, masses of fresh earth, covered with grass, used to line the outsides of ramparts, parapets, &c.

GEH'LENITE, a mineral, found in the Tyrol, and named after Gehlen the chemist It is a ferrosilicate of alumina and lime.

GEL'ATIN or GEL'ATINE (*gelatio*, a freezing: *Lat.*, from its assuming the solid form on cooling), a concrete animal substance, or jelly, obtained by boiling the muscles, cartilages, bones, tendons, &c., in water; glue and isinglass are examples of this substance. About one-half of dry gelatine consists of carbon, one-quarter of oxygen, and the remainder of nitrogen and hydrogen. Alcohol and tannin precipitate gelatine from its solution; the former by abstracting the water, the latter by combining with the substance itself so as to form an insoluble compound. Gelatine forms a tremulous solid when cold, and again liquefies on the application of heat It may be kept in a dry state for a long time, but it soon putrefies in contact with water.

GEM'INI (*Lat.*), in Astronomy, the *Twins*, a constellation and sign of the zodiac, representing Castor and Pollux. It is easily recognized, by two conspicuous stars of the second magnitude very near each other; Castor being to the east, and Pollux to the west.

GEMMA' (*Lat.*), in Botany, a leaf-bud. Leaf-buds appear in the axils of leaves, i. e. in the angle between a leaf and the stem They are formed at first by prolongations from the medullary rays bursting through the bark. They are usually protected by scales until the leaves have expanded to a certain extent.——GEMMÆ, in the plural, is applied to certain structures which are thrown off by some cryptogamic plants (liverworts, for instance), and are capable of forming new individuals.

GEMMA'CEOUS (*gemma*, a bud: *Lat.*), a Botanical term applied to a flower-stalk which grows out of a leaf-bud.

GEMMA'TION (same *deriv.*), in Botany, the arrangement of leaves in the bud.

GEMMIP'AROUS (*gemma*, a bud; and *pario*, I bring forth: *Lat.*), an epithet applied to animals, which propagate by shoots, as most of the *polypi*.

GEM'MULE (*gemmula*, the dim. of *gemma* *Lat.*), in Botany, the ascending axis or plumule of an embryonic plant.

GEMS (*gemma*, a precious stone: *Lat.*), the name given to *precious stones* in general, but more especially to such as by their colour, brilliancy, polish, purity, and rarity, are sought after as objects of decoration. Gems of the most valuable kinds form the principal part of the crown jewels of sovereign princes, and are esteemed not merely for their beauty, but as comprising the greatest value in the smallest bulk. Gems are remarkable for their hardness and lustre. Those usually employed are diamonds, sapphires, emeralds, rubies, topazes, hyacinths, and chrysoberyls, which are the most valuable; crystalline quartz, pellucid, opalescent, or of different hues; amethyst, lapis lazuli, malachite, jasper, agate, chalcedony, onyx, carnelian, and blood-stone. They are of various classes, and proportional values.——GEM-ENGRAVING or *Gem-sculpture*, called also *lithoglyptics*, is the art of representing designs upon precious stones, either in raised work, as *cameos*, or by figures cut below the surface, as *intaglios*. This art is of great antiquity, and was probably practised by the Babylonians. Some think it originated in India; but wherever it began, we have ample evidence that it was in high esteem among the Greeks and Romans.

GENDAR'MES or GENS D'ARMES (*Fr.*: literally, armed persons), in the history of France, a select body of troops, destined to watch over the public safety, and consequently much employed by the police. They were so called on account of their succeeding the ancient gendarmes, who were completely clothed in armour. August 16th, 1830, a royal ordinance abolished the *gens d'armes*, and established a new body called the *municipal guard* of Paris, to consist of 1443 men, under the direction of the prefect of police.

GEN'DERS (*genus*: *Lat.*), in Grammar, are either masculine, for the male sex; feminine, for the female sex; or neuter, for nouns which are of neither sex. In Latin, the termination of a noun distinguishes the gender in many instances, *us* for the masculine, *a* the feminine, and *um* the neuter. Corresponding terminations are found in other languages. In these the idea of sex is carried out in nouns that represent things which are really sexless and would be called neuter by us. The English language has very few terminations by which the genders are distinguished, such as *count* and *countess*.

GENEAL'OGY (*genealogia*: from *genea*, descent; and *logos*, a description: *Gr.*), a history of the descent of a person or family from a series of ancestors. In various chapters and military orders, it is required that the candidates produce their genealogy, to show that they are noble by so many descents.

GEN'ERAL (*generalis*, relating to all: *Lat.*), the highest rank in the British army next to field-marshal. Lieutenant-generals rank next to the generals, and then come the major-generals. These officers have no duties unless specially entrusted with a command. The colonelships of regiments are distributed amongst them. The chief commander of an army is often called, by way of distinction, the *general-in-chief*.——A particular beat of drum which in the morning gives notice to the infantry to be in readiness to march, is also called the *general*.

GENERALIS'SIMO (*Ital.*), the supreme general or commander-in-chief of an army.

GEN'ERAL IS'SUE, in Law, that plea which denies at once the whole declaration or indictment, without offering any special matter by which to evade it. This is the ordinary plea upon which most causes are tried, and is now almost invariably used in criminal cases. *It puts everything in issue, that is, denies everything, and requires the party to prove all that he has stated. In many cases, for the protection* of justices, constables, excise officers, &c., they are, by act of parliament, enabled to plead the general issue, and give the special matter of their justification, in evidence.

GEN'ERALIZE, in Logic, to comprehend, under a common name, several objects, agreeing in some point, indicated by the common term.

GEN'ERATING LINE or FIGURE (*genero*, I produce: *Lat.*), in Geometry, that which, by its motion, produces any plane or solid figure, &c. Thus, a right line moved parallel to itself, generates a parallelogram; made to revolve in the same plane, round one of its extremities, it generates a circle. One entire revolution of a circle, along the same right line, generates the cycloid; and the revolution of a semicircle round its diameter generates a sphere, &c.

GEN'ERATOR (a producer: *Lat.*), in Music, the principal sound or sounds by which others are produced. Thus the lowest C for the treble of the pianoforte, besides its octave, will strike an attentive ear with its twelfth above, or G in alt, and with its seventeenth above, or E in alt. Hence C is called their *generator*, the G and E its products or *harmonics*.

GENER'IC (*genus*, a class: *Lat.*), pertaining to or connected with a *genus*, which see.

GEN'ESIS (an origin: *Gr.*), a canonical book of the Old Testament, and the first of the Pentateuch, or five books of Moses. The Greeks gave it the name of Genesis, from its beginning with an account of the creation of the world.

GEN'ET (*genette*: *Fr.*), the *Genetta vulgaris* of naturalists, a carnivorous animal, the size of a small cat, which is a native of Africa, Asia, and the south of Europe. Like its ally the civet cat, it produces an agreeable perfume, but less powerful and less permanent.—Also, a small-sized well-proportioned Spanish horse.

GENETH'LIACS (*genethliakos*, belonging to one's birthday: *Gr.*), the pretended art of calculating nativities.——Also, a short poem composed in honour of an individual.

GENIC'ULATED (*geniculatus*, with a bended knee: *Lat.*), in Botany, bending abruptly, like the knee.

GENIOGLOS'SI (*geneion*, the chin; and *glōssa*, the tongue: *Gr.*), in Anatomy, a pair of muscles with which the tongue is thrown out.

GENIS'TA (*Lat.*), in Botany, a genus of leguminous shrubs, including the *G. tinctoria*, or dyer's broom, and several other species of broom.

GEN'ITIVE CASE (*genitivus*, generative: *Lat.*), the second case in Latin and Greek nouns, which denotes possession or relation; it is usually marked in English by *s* with an apostrophe, thus (*'s*).

GE'NIUS (*Lat.*, from *gigno*, I produce), in the belief of the old Etruscans, a spiritual agency of a very indeterminate kind, appropriated not only to every human family and individual, but also to Gods, places, and things. Among the Romans, it became mingled with the Grecian doctrine of demons. According to them, every person had his own genius, that is a spiritual being, which introduced him into life, accompanied him during the course of it, and again conducted him out of it at the close of his career.——Genii, among the eastern nations, a race of beings created from fire, occupying an intermediate place between men and angels; endowed with a corporeal form, which they could change at pleasure. They are supposed to interest themselves greatly about the affairs of men, and to have considerable influence over them.

GE'NRE (*Fr.*). Pictures representing subjects of every-day life, whether real or fictitious, but not portraits or landscapes, are styled *genre* pictures. Wilkie's Blind Fiddler, Leslie's Sancho Panza and the Duchess, and Frith's Railway Station, may be cited as well-known examples.

GENTIA'NA (*Lat.*, from *Gentius*, king of Illyria), in Botany, a genus of plants, nat. ord. *Gentianaceæ*, containing many species, of which some are wild in Britain, and known for their bitter juice. The *Gentiana lutea* is a native of the mountainous parts of Germany, and the Swiss and Austrian Alps. Its root, the only part used, has a yellowish-brown colour, and very bitter taste; and its infusion or tincture is an excellent stomachic bitter.

GEN'TILES (belonging to the same race: *Lat.*), a name given in the sacred writings to all who were not of the twelve tribes of Israel.

GEN'TLEMAN (*gens*, a race: *Lat.* – the English word *gentle* originally meant belonging to a race or family), in Heraldry, any one entitled to coat armour; but the term is usually applied to those having no other title. Certain persons were born or made gentlemen, either expressly or by their office; but, as a rank, that of gentleman is now obsolete.

GEN'TLEMEN-AT-ARMS, a body of forty gentlemen, who attend in uniform in the sovereign's presence-chamber at levees and drawing-rooms, and on other state occasions. They receive pay, and have a captain at their head, usually a nobleman, who retires with the ministry.

GENTOO', a native of India who professes the religion of the Bramins. [See Hindoo.]

GE'NUS (*Lat.*), in Natural History, a group of species having some common characters which supply the definition of the genus. Thus the Asiatic and the African elephants are so far distinct that they are considered separate as species; but they have so much in common, that they are placed in the same generic group. In naming a species, naturalists give first the name of the genus, e.g. *Elephas*, and then the specific designation, e.g. *Elephas indicus*, or *Elephas africanus*. A genus is itself a subdivision of a family or an order. [See Species.]——In Logic, one of the predicables, which is considered the material part of the species of which it is affirmed.——In Music, the name for any scale of music: thus, the *diatonic genus*, which proceeds by the tones and semitones belonging to the key; and the *chromatic genus*, which proceeds entirely by semitones.

GEOCEN'TRIC (*gē*, the earth; and *kentron*, a centre: *Gr.*), in Astronomy, literally *having the earth for centre*. It is opposed to *heliocentric, having the sun for centre.* These terms are used only with regard to the solar system. The fixed stars are so distant that they are referred to the same place, whether supposed to be seen from the earth or the sun. The geocentric place of a planet is the place of the centre of the planet as it would appear from the centre of the earth; the heliocentric place such as it would appear from the centre of the sun. ——Geocentric Latitude of a planet, the angle made by a line drawn from the planet to the earth, with the plane of the ecliptic. ——Geocentric Longitude, the angle at the earth, made by two straight lines, one drawn from the planet to the first point of Aries, the other to the point of the ecliptic, intercepted by a perpendicular circle, the plane of which passes through the earth and planet.

GE'ODE (*geōdēs*, earthy: from *gē*, the earth; and *eidos*, form: *Gr.*), in Mineralogy, a roundish lump of agate or other mineral. Sometimes its interior is empty, and the sides of its cavity are lined with crystals; at others it contains a solid movable nucleus, or is filled with an earthy matter ——Geodiferous, producing geodes.

GEOD'ESY (*gē*, the earth; and *daio*, I divide: *Gr.*), literally a division of the earth, in which sense it is synonymous with *land surveying*; but it is applied in a more general sense to that part of practical geometry which relates to the determination of the magnitude and figure of the earth, or any portion of its surface. Hence it includes all the geometrical and trigonometrical operations necessary for the purpose; which are called *geodesical* or *geodetical*, in opposition to *astronomical*, or those required for determining azimuths and latitudes.

GEOG'NOSY (*gē*, the earth; and *gnōsis*, knowledge: *Gr.*). This word is nearly synonymous with *geology*, which see.

GEOG'RAPHY (*geōgraphia*: from *ge*, the earth; and *graphē*, a description: *Gr.*), the description of the earth as a whole, its surface, natural divisions, and local characteristics. The fundamental principles of geography are the spherical figure of the earth, its rotation on its axis, its revolution round the sun, and the position of the axis or line, round which it revolves, with regard to the celestial luminary; whence it follows that astronomy is the key of all geographical knowledge. The figure of the earth is that of an oblate spheroid, that is to say, it is a globe flattened at each pole. There is a difference of about 26½ miles between the polar and equatorial diameters. [See EARTH.] *General* geography comprehends the knowledge of the earth in general, and the phenomena common to the whole globe. *Particular* geography has relation to particular countries, showing their boundaries, figure, climate, seasons, inhabitants, arts, customs, language, history, &c. When it has reference to regions, districts, or parts or countries, it is called *chorography;* and when to particular cities, towns, or villages, &c., it is called *topography*. *Ancient* geography treats of the countries and places existing among the ancients; *modern* geography describes the various countries that now exist, and of which we are able to glean information from travellers. There are also other aspects under which geography may be considered; viz. as mathematical, physical, and political. *Mathematical* geography determines the form and dimensions of the earth; its relations with the celestial bodies; the relative positions and distances of places on its surface, and their representation by globes or maps. To ascertain the relative position of different places, geographers refer them to two *great circles*, that is, circles formed by the intersection of planes passing through the earth's centre. One of these, the *equator*, is equally distant from the poles; and the other is a meridian which passes through the poles and a given place from which the reckoning commences. The *latitude* of any place is its distance north or south of the equator, measured on its meridian. Latitude, therefore, is equal to the elevation of the pole above the horizon. *Longitude* is the distance of the meridian of any place, east or west, from what is called the first meridian, measured on the equator. For a *first meridian*, astronomers and geographers generally choose the meridian passing through the capital of their own country; though it is manifest that any other would do equally well. The first meridian of English geographers passes through Greenwich; that of the Parisians through the observatory at Paris. Latitude is found by astronomical observations; and longitude, by the interval which elapses between the times at which any celestial body passes over the respective meridians. *Distance* may be ascertained by changing degrees into miles. [See DEGREE.] *Physical* geography in its most extended sense comprises geology, hydrography, meteorology, and a description of the animal, vegetable, and mineral kingdoms; but it is usually limited to a description of the outward features of the globe, with an account of their bearings upon one another. Land occupies only one-third of the surface of the globe; and of this land, four-fifths are situated in the northern hemisphere; it is found chiefly in three great masses; viz. the *Old Continent*, comprising Europe, Asia, and Africa; the *new continent*, comprising North and South America, and *New Holland:* those are separated from each other by great oceans. In *political* geography, the earth is considered as the abode of rational beings, divided into larger or smaller societies, according to their diffusion over the globe, and their social relations. It considers the language, religion, government, degrees of civilization, population, resources, and local relations of the different countries; and therefore includes history and statistics. As a science the ancients knew but little of geography; yet we find that they did not overlook or neglect it. It was a constant custom among the Romans, after they had conquered and subdued any province, to have a map of it carried in triumph, and exposed to the view of the spectators. Historians inform us that the Roman senate, about a hundred years before Christ, sent geographers into various countries, that an accurate survey and mensuration of the globe might be obtained; but we now know that they saw scarcely the twentieth part of it. Before them, Necho, king of Egypt, commanded the Phœnicians to make a survey of the whole coast of Africa, which they accomplished in three years. Darius ordered the Ethiopic sea, and the mouth of the Indus, to be surveyed; and Pliny relates that Alexander, in his expedition into Asia, took two geographers to measure and describe the roads; and that from their itineraries the writers of the following ages gleaned the chief portions of their information. The honour of reducing geography to a system was, however, reserved for Ptolemy, who, by adding mathematical advantages to the historical method in which it had been treated of before, described the world in a much more intelligible manner; delineating it under more certain rules, and fixing the bounds of places from longitude and latitude. As a work of science, therefore, his system deservedly held the first rank among the ancients; and but little was added to what he achieved until the time of Copernicus, A D. 1520. From that period to the present, the science of geography has been steadily advancing; continual accessions to it having been made, by new discoveries, by accurate accounts of travels by land and water, by systematic topographies, and more precise measurements.

GEOL'OGY (*ge*, the earth: *logos*, a discourse: *Gr.*), the science which investigates the structure of the earth and the history of the successive changes it has undergone. The series of events to be unravelled is very complicated, and it requires a close, patient and skilful examination of the facts before they can be arranged in their true order. The rocks constituting the crust of the earth have not all had the same origin. Some have evidently solidified from a state of fusion: others appear to have been deposited in water; and a third series seems to have been originally deposited like the last in water, but to have been subsequently acted upon by heat. Hence arises the division of rocks into igneous, sedimentary, and METAMORPHIC. The igneous rocks include GRANITE and SYENITE (both of which are conjectured to have cooled slowly from a melted state under great pressure), and the series of TRAPS (BASALT, TRACHYTE) and LAVAS, which have issued from the mouths of VOLCANOES and flowed along the surface of the earth, or over the beds of shallow seas. The igneous rocks are confined to no one age; they are found interposed between or striking through sedimentary beds of all ages. It is only of late years that the key for unlocking the great difficulties of the road has been discovered, and this has been afforded by a study of the organic remains which most strata of the earth contain. For reliable conclusions as to these the geologist must look to the comparative anatomist, the conchologist, and the botanist. The remains are not scattered promiscuously throughout all strata; they are confined to those which have been deposited by water, and in these a given form has a limited range, being only found in one bed, or in a small series of beds. The older the bed the more distinct are the fossil forms from existing forms. Moreover, whenever a species present in the lower beds of a series is absent from the middle beds, it will not be found again in the higher beds; it has disappeared altogether. Reasoning on these facts, the geologist concludes that the rocks which contain remains of animals resembling existing marine animals were deposited by the sea, and that the age of any bed of a series is to be determined by its relative position, being older than those above and newer than those below it, unless there is evidence of local disturbance. Moreover, if a bed in a given locality is found to contain organic remains resembling those discovered in a bed situate in another locality, he will conclude that the two beds are of the same age, although their mineral constituents may be different, so that the date of the latter bed with reference to adjacent beds being known, the date of the former with reference to adjacent beds is known also. Again, a bed may be found whose organic contents agree in part with those of one bed of a known series and in part with those of a neighbouring bed, in which case it will be classed either as chronologically between the two, or as contemporaneous with both. On these principles the sedimentary rocks are arranged in periods and groups, distinguished by the peculiarities of the organic remains they contain. Each group consists of numerous beds which may differ widely from each other in most particulars, but which agree more or less in their organic contents. To say that a bed belongs to a given group implies only that it is of a certain age, and the age is chiefly determined by the foreign bodies embedded in the deposit and the order of superposition. It has been found that the whole series of sedimentary rocks may be naturally divided into three periods, viz.: Primary or palæozoic (the most ancient), secondary, and tertiary; and each of these is again divided with reference to differences in mineralogical characters and the embedded organic remains into systems, which are again subdivided into formations. For some account of the rocks of which the earth's crust is composed the reader may refer to CHALK, CLAY, LIMESTONE, and SANDSTONE. As to the state in which organic remains are found, see FOSSILS. The following is a list of the periods and systems into which the sedimentary strata of the earth have been divided. Some account of each group will be found in its alphabetical place:—

POST TERTIARY, or the Post Pliocene system.

TERTIARY, including the Pliocene, Miocene, and Eocene systems.

SECONDARY, including the Cretaceous, Oolitic, Liassic, and Triassic systems.

PRIMARY, including the Permian or Magnesian Limestone, Carboniferous, Devonian, Silurian, Cambrian and Laurentian systems.

A great light was thrown upon many difficult geological questions when it was ascertained that large portions of the earth's surface are slowly subsiding, and other portions are slowly rising. It is easy to conceive how, during a succession of ages, dry land may have been sunk below the ocean, and been elevated many times. Deposits would thus accumulate upon it under different circumstances, and denudation would occur, both in sinking and rising, by the action of the waves upon an ever-varying shore. The solid matter thus removed was of course deposited elsewhere, and hence we obtain some notion of the complicated series of events already alluded to, as having acted in forming the shell of the globe and sculpturing its surface. [See DENUDATION.]

GEOM'ETRY (*gē*, the earth; and *metron*, a measure: *Gr.*), that branch of mathematics which treats of the properties of figured space. The Greeks cultivated geometry more than any other people, but from the time of Euclid, who died 300 years B.C., to the 15th century, geometry was neglected. Since its revival, it has benefited by the illustrious labours of Napier, Descartes, Newton, and Leibnitz. The science of geometry is distinguished into the theoretical and the practical. *Theoretical or speculative* geometry treats of the various properties and relations in magnitudes, &c. *Practical* geometry comprehends the construction of figures, the drawing of lines in certain positions, as parallel or perpendicular to each other, &c. Speculative geometry is again distinguished into *elementary geometry*, which treats of the properties and proportions of right lines and right-lined figures, as also of the circle and its several parts; and the *transcendental geometry*, which treats of the higher order of curves, &c. *Elementary geometry* treats only of the right line and circle, of figures bounded by right lines and circles, and of solids bounded by these figures. The construction of algebraic equations of the second degree, and all problems that can be solved by right lines and circles, belong to elementary geometry. The following are definitions of great practical importance. A *point* is that which has neither length, breadth, nor thickness. A *line* has length without breadth or thickness. A *superficies*, or *surface*, has length and breadth only, the boundaries of which are lines. A *solid* is a figure which has length, breadth, and thickness. A *curve* continually changes its direction. A *straight* line lies evenly between its extreme points. *Parallel* lines keep at the same distance from each other if extended indefinitely. A *perpendicular* is a line standing upon another line, with which, or with its prolongation, it makes two equal angles, called *right angles*; an *obtuse angle* is greater, and an *acute angle* is less, than a right angle. A figure of three sides and angles is called a *triangle*. An *equilateral* triangle is that whose three sides are equal. An *isosceles* triangle is that which has two sides equal. A *scalene* triangle is that whose three sides are all unequal. A figure of four sides and angles is called a *quadrangle*, or *quadrilateral*. A *parallelogram* is a quadrilateral which has both its pairs of opposite sides parallel; and a *rectangle* is a parallelogram having four right angles. Four-sided figures are, moreover, distinguished, according to their sides and angles, into a *square*, having all its sides equal, and its angles right angles; a *rhombus*, having all the sides equal, but the angles not right angles; and a *rhomboid*, having the opposite sides equal two and two, and the angles not right angles. When a quadrilateral has none of its sides parallel, it is a *trapezium*; and when only two of its sides are parallel, a *trapezoid*. The *diagonal* is a right line which joins two opposite angles of a parallelogram, and divides it into two equal triangles The *base* of a figure is the side on which it is supposed to stand. The *vertex* is the extreme point opposite to the base; the *altitude* is the perpendicular distance from the vertex to the base.—A *circle* is a plane figure bounded by a curve line, called the *circumference*, which is everywhere equidistant from a certain point within, called its *centre*; the *radius* of a circle is a line drawn from the centre to the circumference; the *diameter* of a circle is a line drawn through the centre, and terminating at the circumference on both sides; an *arc* of a circle is any part of the circumference; a *chord* is a right line joining the extremities of an arc; a *segment* of a circle is any part of a circle bounded by an arc and its chord; a *semicircle* is half the circle, or a segment cut off by a diameter; a *sector* is any part of a circle which is bounded by an arc and two radii drawn to its extremities; and a *quadrant*, or quarter of a circle, is a sector having a quarter of the circumference for its arc. The circumference of every circle is supposed to be divided into 360 equal parts, called *degrees*, each degree into 60 *minutes*, and each minute into 60 *seconds*: hence a semicircle contains 180 degrees, and a quadrant 90 degrees. A *pyramid* is a solid having any rectilineal figure for its base, and for its lateral surfaces triangles whose vertexes meet in one point. A *prism* is a solid figure contained by plane figures, of which two that are opposite are equal, similar, and parallel to one another, and the others plane parallelograms. A *sphere* is a solid figure described by the revolution of a circle. A *cone* is a solid figure described by the revolution of a right-angled triangle about one of the sides containing the right angle. A *cylinder* is a solid figure described by the revolution of a right-angled parallelogram about one of its sides. And a *cube* is a solid figure contained by six equal squares. An *axiom* is a manifest truth not requiring a demonstration. The following are examples of axioms:—'Things equal to the same thing are equal to one another.' 'The whole is greater than any of its parts, and equal to the sum of all its parts.' 'If equal things be taken from equal things, the remainders will be equal.' 'Magnitudes which coincide with one another, or which exactly fill the same space, are equal to one another.' A *proposition* is something proposed either to be done or to be demonstrated, and is either a problem or a theorem. It is a *problem* when it proposes anything to be done, as to divide a given line into two equal parts, or to erect a perpendicular. It is a *theorem* when it proposes something to be proved, as that triangles having the same base and altitude are equal to each other, or that the angles in the same segment of a circle are equal. When something is premised, or demonstrated, in order to render what follows more easy, it is termed a *lemma* A *corollary* is a consequent truth, gained immediately from some preceding truth or observation. A *scholium* is a remark or observation made upon something going before it.——*Transcendental geometry* is, strictly speaking, that which has for its object all curves but the circle, and all equations above those of the second degree. Some, however, understand it as the application of the differential and integral calculus to the investigation of the properties of curved lines and surfaces.——GEOMETRICAL DEMONSTRATION. The method of *superposition* consists in showing that two figures being applied to each other will coincide or fill the same space; and, therefore, that they must be equal. A *reductio ad absurdum* consists in assuming the proposition not to be true, and reasoning from this assumption till consequences are deduced which are either contradictory of the hypothesis, which therefore it is absurd to suppose true, or are contradictory of some proposition previously demonstrated.——GEOMETRICAL INVESTIGATION is carried on by two methods; that of analysis, and that of synthesis. *Analysis*, *resolution*, or *inverted solution*, consists in setting out from the thing demanded, and arriving by certain established truths, termed *antecedents*, at something known or acknowledged to be true. *Synthesis*, on the contrary, begins with that proposition which ended the analysis just mentioned; and passes from one to another of the former antecedents, which now become *consequents*, taking them in an inverted order, until the conclusion sought, or that with which the analysis began, is established.——*Algebra applied to geometry*. This species of analysis was unknown to the ancients, but has produced the most important results in the hands of the moderns. Subjects which ancient geometry could reach only in some limited cases, and with difficulty, are demonstrated algebraically with great facility.——**GEOMETRICAL PROPORTION**, the equality of geometrical ratios. The *geometrical ratio* between two quantities is expressed by the quotient obtained by dividing one called the *antecedent* by the other called the *consequent*. It is the foundation of the rule of proportion, commonly called the *rule of three*.——**GEOMETRICAL PROGRESSION** is a series in which the terms increase or decrease by a common multiplier or ratio: thus 2, 4, 8, 16, 32; or 32, 16, 8, 4, 2.

GEOPON'ICS (*geōponikos*, belonging to agriculture, from *gē*, the earth; and *ponos*, labour: *Gr.*), the art or science of cultivating the earth.

GEORA'MA (*gē*, the earth; and *orao*, I see: *Gr.*), a hollow sphere, representing the surface of the earth, its mountains, seas, rivers, &c.

GEOR'GICS (*geōrgikos*, belonging to tillage, from *gē*, the earth; and *ergon*, work: *Gr.*), a poetical composition, treating of husbandry, after the manner of Virgil's poem on rural subjects, bearing this title. This poem, completed about 31 B.C., is in four books; the first of which treats of ploughing and preparing the ground; the second, of sowing and planting; the third, of the management of cattle, sheep, and goats; and the fourth is occupied with bees.

GEOR'GIUM SI'DŪS, the name given by Herschel, in honour of George III., to the planet which he discovered in 1781: now known as URANUS.

GERA'NIUM (*geranos*, a crane: *Gr.*, from the form of its fruit), a genus of plants, nat. ord. *Geraniaceæ*. There are numerous species, but most of the cultivated plants known as geraniums belong to the genus *Pelargonium*. The common wild herb Robert is *Geranium Robertianum*.

GERMAN'DER, in Botany, the name of several plants, as the *rock germander*, of the genus *Veronica*, and the *common* and *water* germander, of the genus *Teucrium*.

GER'MAN SIL'VER, an alloy of nickel, zinc, and copper. It is sometimes called *white copper*.

GER'MEN (a bud: *Lat.*), in Botany, the ovary, that part of the pistil which contains the ovules or young seeds.

GERMINA'TION (*germinatio*, from last), the act by which the embryo of a seed becomes developed into a plant. A temperature of between 60° and 80° is most favourable for germination; but some seeds require a tropical temperature. No seed will grow without moisture. Air also is necessary; hence seeds buried too deeply will not grow, but light is injurious. The root is developed first. The cotyledons, if not changed into leaves, rot away.

GERU'SALEMME LIBERA'TA, La, the title of Torquato Tasso's epic poem, published at Parma in 1581, when the author was in prison at Ferrara. The original manuscript, in Tasso's handwriting, is preserved in the Soane Museum, London. It is in OTTAVA RIMA, and divided into 20 cantos. Its subject is the first crusade, when Godfrey of Bouillon was one of the chief commanders, and it ends with the taking of Jerusalem in 1099. There are several English translations of this poem, and it has also been translated into most other languages of Europe. Everyone who reads the 'Jerusalem Delivered' remarks the melancholy feeling that pervades it, a melancholy that flowed naturally from the unhappiness of Tasso's mind and life. The diction has excited great admiration, from its grace and finish. In accordance with the taste of the time supernatural machinery is employed. The loves of the crusaders are freely introduced, and there are many descriptions of battles, as was to be expected from the subject. In the choice of this subject, Tasso has been thought to have had an advantage over Homer, but in vigour and originality the Italian is much below the Greek poet.

GES'NERA (from *Gesner*, a Botanist), in Botany, a genus of herbaceous or shrubby plants with showy flowers, nat. order *Gesneraceæ*.

GEY'SERS (from an Icelandic word signifying *raging* or *roaring*), the name of some fountains of hot water in Iceland, which spring at intervals 90 feet into the air, and then subside into their basins, which are lined with sinter, a siliceous deposit of the water. Various theories have been put forward to account for this curious phenomenon.

GHAUT, or **GHAT**, a word which originally meant a pass through a mountain; but in the East Indies, at present, it is used to denote any extensive chain of hills.

GHAZEL, an amatory ode amongst the Arabians and Persians, composed of not less than seven nor more than thirteen couplets. The second lines of the couplets rhyme together throughout the poem, the first lines have no rhymes.

GHEE, butter made in India from the milk of cows and buffalos, and clarified, after which it will continue sweet for some time. It is an article of considerable commerce, and is usually conveyed in bags of hide containing many gallons in each. Ghee is also made in Northern Africa.

GHIB'ELINES, a faction in Italy, in the 13th century, who were the opponents of another faction called the *Guelfs*, which see. They maintained the supremacy of the German emperors over the Italian states, which was disputed by the popes.

GHOST, HOLY. All Christians who subscribe to the doctrine of the Athanasian Creed believe the Holy Ghost to proceed from the Father and the Son. The Greek Church maintains that the Holy Ghost proceeds from the Father only; and this difference is one of the main points of distinction between that church and the Roman Catholic.

GI'ANT'S CAUSE'WAY, a vast assemblage of basaltic rocks, on the northern coast of Ireland, extending two miles in length along the coast of Antrim, and probably once continued to the coast of Scotland to the spot known by the name of Fingal's Cave. It consists of many hundred thousands of columns of a black kind of rock, hard as marble, about twenty feet in height, and nearly all of a pentagonal or five-sided figure. So compactly are the whole arranged that a knife can scarcely be introduced between them. Basalt displays more or less of this prismatic structure in all countries where it is found. It is the result of cooling from a state of fusion, and the prisms are always at right angles to the cooling surfaces, so that in dikes they are horizontal, whilst in a stream on the surface of the earth they are upright.

GIAOUR (dog: *Turk.*), a term commonly applied by the Turks to the adherents of all religions except the Mohammedan, whether Zoroastrians, Christians, or Jews. Some derive the word from Guebre, or Ghebr, a Persian word, meaning a worshipper of fire.

GIB'BON, a long-armed monkey. [See HYLOBATES.]

GIB'BOUS (*gibbus*, convex : *Lat.*), in Astronomy, a term applied to the bright portion of the moon, during her course from full to new, when the dark part appears falcated or horned, and the light part convex or gibbous.

GIE'SECKITE, a mineral discovered in Iceland, by Giesecke. It occurs in brownish hexagonal prisms, and is a hydrated silicate of alumina and potash.

GILD'ING (*gildan*, to overlay with gold : *Sax.*), the art of covering anything with gold, either in a foliated or liquid state. There are three distinct methods in general practice : namely, *wash* or *water gilding*, in which the gold is spread, whilst reduced to a fluid state, by solution in mercury; *leaf gilding*, either burnished or in oil, performed by cementing thin leaves of gold upon the work, either with size or by oil, and *japanner's gilding*, in which gold dust or powder is used instead of leaves. When gold is to be applied to anything that is of metal, the surface is previously covered with some gluey substance or size ; and when it is to be exposed to the effects of the weather, a composition of drying oil and ochre is used in place of the water-size. In the process of gilding metals, the surface is first cleansed, and then the leaves applied, which, by means of burnishing, and a certain degree of heat, are made to adhere in the manner desired. Gold is applied to glass, porcelain, and other vitrified substances, the surfaces of which, being very smooth, are capable of perfect contact with the gold leaves. Within the last few years, nearly all the gilt articles manufactured at Birmingham have been gilt by an electrotype process.

GILLS (*gula*, the neck : *Lat.*), the organs of respiration in fishes, consisting of some cartilaginous or bony arches attached to the bones of the head, and furnished on the exterior convex side with a multitude of vascular fibrils of a red colour. The water is admitted by the mouth, and escapes by the gill-openings, passing over the gills, and thus the air contained in the water acts upon the blood, as it circulates in the fibrils ——GILL, a measure of capacity, containing the fourth part of a pint; but among miners, a measure equal to a pint.

GILLY'FLOWER (corrupted from July flower, *girofleur : Fr.*), the name of certain plants. The *clove gillyflower* is of the genus *Dianthus*, or carnation pink; the *stock gilly flower* is a *Cheiranthus* ; and the *queen's gilly flower* a *Hesperis*.

GILT'HEAD, the *Chrysophrys auratus*, an acanthopterygious fish, so named from a golden spot between the eyes.

GIM'BALS (*gemellus*, paired : *Lat.*), a pair of brass hoops or rings, one of which moves within the other, about two axes placed at right angles. They are used for suspending a sea compass in its box, and keeping it in a horizontal position, notwithstanding the rolling of the ship.

GIN (*genièvre*, juniper: *Fr.*), a spirit formerly obtained, from oats, barley, or malt, redistilled with the addition of berries of the *genièvre* or juniper tree; but now made principally of malt spirits, flavoured by oil of turpentine. *Hollands* gin, manufactured chiefly at the village of Schiedam, is derived from wheat or rye, and flavoured with juniper berries.

GIN'GER (*zingiber : Lat.*), the dried root stock or rhizome of the *Zingiber officinalis*, an East Indian plant, which is also cultivated to a considerable extent in Jamaica and other West India islands. The root stock is of the thickness of a finger, knotty, irregular, and creeping. It possesses an aromatic, pungent flavour; makes an excellent preserve, and is used medicinally as a carminative.

GIN'GLYMUS (*gigglumos*, a hinge : *Gr.*), in Anatomy, a species of articulation resembling a hinge.

GIN'SENG, a Chinese word, applied to the root of the *Panax quinquefolia*, found in the northern parts of Asia and America. It has a fleshy, tapering root, about the thickness of the finger, which, when dry, is of a yellowish-white colour, with a mucilaginous sweetness in the taste, accompanied with a slight bitterness. The Chinese value the ginseng highly, and, as well as the Asiatics in general, think it almost a universal medicine. They have recourse to it in all diseases. The virtues generally ascribed to it are those of a restorative and a cordial. It is a monopoly of the government, and only a few persons have the privilege of purchasing the roots for their weight in gold. Our ivy belongs to the same nat. ord. *Araliaceæ*.

GIP'SIES, or GYP'SIES, a wandering tribe or race of vagrants, spread over the greater part of Europe, and some parts of Asia and Africa. The name is supposed to be corrupted from *Egyptian*, as they were formerly thought to have come from Egypt; but their origin is uncertain. They first appeared in western Europe, in the 15th century, under a leader who styled himself the Duke of Lower Egypt. The French call them Bohemians, the Italians *Zingari*. Their language is everywhere the same. Gipsies are remarkable for the yellow-brown, or rather olive colour of their skin; the jet-black of their hair and eyes; the extreme whiteness of their teeth ; and the symmetry of their limbs, which distinguishes even the men, whose general appearance, however, is repulsive. Though some occasionally follow a trade or honest occupation, they rarely settle permanently anywhere. Wherever the climate is mild enough, they are found in forests and deserts, in companies. They seldom use tents, but seek shelter from the cold of winter in grottoes and caves, or they construct huts, sunk some feet in the earth, and covered with sods laid on poles. They are fond of instrumental music, which they perform chiefly by ear, and their lively motions are remarkable in their own peculiar dances. The men obtain their living by gymnastic feats, tricks, &c., while the women invariably practise fortune-telling and chiromancy. They are not particular in their food, but eat all kinds of flesh, even that of animals which have died a natural death. Brandy is their favourite beverage, tobacco their greatest luxury; both men and women chew and smoke it with avidity, and are ready to make great sacrifices for the sake of satisfying this inclination. They have no settled religious notions: amongst the Turks they are Mohammedans; in Christian countries, if they make any religious profession at all, they follow the forms of Christianity, without, however, taking any interest in its spirit, or caring for instruction in it. They marry with none but their own race: their marriages are contracted in the rudest manner, and when a gipsy becomes tired of his wife, he turns her off without ceremony.

GIRA'FFE, the *Camelopard*, which see.

GIR'ASOL (*Ital.*), an opal of a white or bluish-white colour, but which, when turned towards the sun or any bright light, reflects a reddish tint; hence its name.

GIRD'ER (*gyrdan*, to enclose: *Sax.*), in Architecture, is the main beam, which either directly supports the flooring of a structure, or which supports the joists or cross beams whereon the flooring rests.

GIR'ONDISTS, a republican party in France at the period of the revolution. They obtained their appellation from several of their most distinguished members having come from the department of the Gironde. They opposed the sanguinary proceedings of the Mountain, the extreme republican party, by whom they were proscribed, and many of them guillotined in June 1793.

GIR'OUETTE (a weathercock: *Fr.*), a term applied to numerous public characters in France, who, during the revolutionary era, turned with every political breeze. To mark these, a *Dictionnaire des Girouettes* was published, containing their names, &c., with a number of weathercocks against each, corresponding to the number of changes in his political creed. [See the 'Biographical Treasury.']

GIV'EN, a term much used by mathematicians, to denote something supposed to be known. Thus, if a magnitude is known, it is said to be a *given* magnitude; if the ratio between two quantities is known, these quantities are said to have a *given* ratio, &c., &c.

GLA'BROUS (*glaber*, smooth: *Lat.*), in Natural History, hairless, smooth.

GLA'CIERS (*Fr.*), immense masses of ice, which accumulate on the peaks and slopes, and in the upper valleys of lofty mountains. In the Tyrol, Switzerland, Piedmont, and Savoy, the glaciers are so numerous that, taken together, they have been calculated to cover 1484 square miles of surface. The snow which lies above the line of perpetual congelation, being partially thawed during the summer months, is converted into ice in the winter, and, by the pressure of the higher portion of the mass, is forced downwards through ravines into the valleys, where they suffer waste from the higher temperature. This gives rise to a stream which rushes to join the nearest river. The snow-line of the Alps is at an elevation of 8000 feet, but the lower edge of some of the glaciers is not more than 3500 above the sea, and hence they lie, in some instances, in the midst of cultivation. The surface of every large glacier is strewed with stones and gravel, which have fallen from the surrounding precipices. This rubbish is partly carried to the sides of the glacier, and there deposited as lateral moraines, and partly to the lower end of the glacier, where it forms a terminal moraine. When the glacier advances into the valley, as it does in a cold season, the moraine is pushed before it; and when, in consequence of a warm season, it retreats, the moraine is left behind. Thus the lower limit of a glacier varies from year to year. In many mountainous countries there are phenomena which geologists explain by supposing that there were glaciers at a former period of time, where none now exist, or that existing glaciers were very much more extensive than at present. The precise mode by which glaciers move along their beds, and the cause of the zoned or ribboned structure of glacier ice have been the subjects of much inquiry, and given rise to some controversy. Professor James Forbes thought the phenomena were to be explained by attributing viscosity to the ice. Another theory is, that the downward journey of a glacier in its groove is not attended by a viscous movement of the particles, but is effected by continual fracture and regelation. This is rendered highly probable by some facts brought out by experiments on small pieces of ice, viz. that they can be made to assume any shape whatever by compression in moulds, and that two pieces of ice brought into contact will immediately freeze together, even when placed in hot water.

GLA'CIS (*Fr.*), in Fortification, a mass of earth serving as a parapet to the covered way, having an easy slope or declivity towards the country.

GLA'DIATE (*gladius*, a sword: *Lat.*), in Botany, an epithet for anything sword-shaped, but shorter and broader than ensiform.

GLA'DIATORS (*gladiatores*, from *gladius*, a sword: *Lat.*), in Antiquity, combatants who fought at the public games in Rome for the entertainment of the spectators. They were at first prisoners, slaves, or condemned criminals; but afterwards freemen fought in the arena, either for hire or from choice, and sometimes even persons of the first families, who had enjoyed the highest honours. The games were commenced by a *prælusio*, in which they fought with weapons of wood, till, upon a signal, they assumed their arms, and began in earnest to fight in pairs. When the vanquished was not killed in the combat, his fate was decided by the people; who, if they wished to save his life, signified it by pressing down their thumbs, but if they wished him to be killed, by turning them up. The first of these signals was called *pollicem premere*, the second *pollicem vertere*. If his life was given to him, he obtained a *missio*, or discharge for that day; and hence, in an exhibition *sine missione* (without any discharge), the gladiators were not spared. The victors were honoured with a palm branch, a sum of money, or other marks of the public favour; and they were not unfrequently released from further service, and received, as a badge of freedom, the *rudis*, or wooden sword. This profession was abolished by Constantine, revived under Constantius and his two successors, but finally put an end to by Honorius

GLADI'OLUS (*Lat*, literally a small sword, from the form of the leaves), in Botany, a genus of plants, nat. ord. *Iridaceæ*. They have beautiful flowers, and gardeners have produced many hybrid varieties.

GLAND (*glans*, literally the nut-like fruit of a forest tree · *Lat*), in Anatomy, an organ of the animal body concerned in the work of secretion. The form and composition of the glands are very various, but they exhibit in the arrangement of the cells a common structural plan. The cells which line their cavities and tubes form an epithelium, and at the same time act as secreting cells, and elaborate the matters which they discharge. The simple glands are without permanent orifices. They serve only a temporary purpose, and consist of nothing more than a vesicle or sacculus, which, after discharging the elaborated matter, disappears. Much more numerous are the permanent glands, which have been classed in three groups, viz. simple tubular glands, such as the sudorific glands of the skin; aggregated glands, such as the salivary glands, which are composed of a number of vesicles in groups or lobules; and the convoluted tubular glands, such as those found in the kidney, which consist of tubules of membrane lined with secreting cells. There is much obscurity as to the process of secretion by the glands. It is no doubt the result of the vital processes of the cells, but why one set of glands should elaborate and discharge the components of saliva, and another set the components of bile, from one common source of supply, viz. the blood, has never been elucidated.

GLAN'DERS (same *deriv.*), a virulent and fatal disease in horses, which shows itself by a discharge of mucus from the nostrils. It may be communicated to man.

GLANDIF'EROUS (*glans*, an acorn; and *fero*, I bear: *Lat*), in Botany, an epithet applied to trees which bear fruit, like acorns, chestnuts, and mast. This kind of fruit is called a nut or *glans* by botanists.

GLASS (*glas: Ger.*); Pliny ascribes its origin to accident. Certain merchants, he tells us, were driven into the mouth of the Belus, a river in Syria, by stress of weather; and being obliged to dress their victuals on the shore, they used kali for fuel, which, combining with the sand, produced glass: a phenomenon which suggested to the people of Sidon the manufacture of that substance for which they afterwards became so celebrated. It is not very likely, however, that the heat employed on such an occasion would have been sufficient to produce glass. Silica, which constitutes the basis of all commercial glass, is not fusible by itself in the strongest fire of our furnaces; but its vitreous fusion is easily effected by the addition of potash or soda, either alone or mixed with lime or litharge The window-glass manufacture was first begun in England in 1557, in Crutched Friars, London; and fine articles of flint glass were soon afterwards made in the Savoy House, Strand. In 1635, the art received a great improvement from Sir Robert Mansell, by the use of coal instead of wood for fuel. The first sheets of blown glass, for looking-glasses and coach windows, were made in 1673, at Lambeth, by Venetian artisans employed under the patronage of the Duke of Buckingham. The casting of mirror-plates was commenced in France about the year 1688, by Thevart, but in excellence and cheapness the French mirror-plate has been for some time rivalled by the English. There are several species of glass, which differ either in the materials, or mode of manufacture 'Ordinary window glass consists principally of fine sand, sulphate of soda and lime, generally introduced in the shape of ground chalk. *Plate glass* is composed of nearly the same materials, with the substitution of the carbonate for the sulphate of soda Ordinary bottle glass is composed of inferior qualities of the same constituents, with the substitution of soapers' waste for the alkaline element, white flint glass consists of the best sand, carbonate of potash, and red lead, or litharge. Besides these principal elements several others, such as nitre, arsenic, and manganese, are used in minute proportions for improving the colour, or other special purposes The pots in which the glass is fused are made of Stourbridge clay, kneaded and built up entirely by hand. In these pots the glass is thoroughly fused at a high temperature for a considerable time, and is then allowed to cool to a suitable consistency for working. *Sheet glass* is blown in long cylinders, which, after the ends are removed, are split down their length by a diamond, and afterwards flattened out in a kiln. *Coloured glass* is divisible into "pot metal," i. e. glass of the same colour throughout its whole thickness, or "flashed," the colour in this case being merely a thin film spread over a body of colourless glass. It is produced by the "gatherer" first dipping his pipe into a pot of coloured glass, and then into one of colourless glass, both being blown into cylinders together. Glass shades for ornaments are produced by the same process as the cylinders for sheet glass. *Crown glass*, an exclusively British manufacture, is first blown in a spheroid form, having a knob, the "bull's eye" opposite to the pipe of the blower. A piece of iron is attached to the bull's eye, and the pipe being detached, the glass is again heated; and being rotated by means of the iron in front of the furnace, gradually spreads out into a perfectly flat circular table, having the bull's eye in the centre—the process being one of the most beautiful in the whole range of glass manufacture. *Optical glass* is the most difficult on a large scale of any of the branches of the manufacture. Flint glass for optical purposes is made by stirring the metal, which contains a large proportion of lead in the crucible, and allowing it very gradually to cool. When cool the crucible is broken away, and the glass broken up into pieces, which are afterwards heated and pressed into a cake-like form. *Shaped glass* is either blown, moulded, or pressed. As to blown glass, in the great majority of cases the glass is blown into a shape somewhat approaching that which it is ultimately to assume, through an iron pipe, one end of which is dipped into a quantity of fluid glass. An iron "pontil" is attached opposite to the pipe, which is then broken off, and the glass adhering to the pontil is shaped with a few simple tools while being rotated. *Moulded glass*, including nearly all the ordinary varieties of bottles, is made by blowing the glass into a mould, the blowing rendering the article hollow, and the mould giving its shape to the exterior. In pressing glass the metal is dropped into a mould of the shape required for the exterior, and a plunger of the shape required for the interior is forced into it. In both moulded and pressed glass the article is generally finished off by being attached to a pontil, reheated and rotated. *Glass cutting* is executed by applying the glass to be cut, first to a cast iron wheel with sand and water, then to a stone wheel, and lastly to a wooden wheel for the polishing with pumice, rotten stone, and putty powder. For polishing chandelier drops, &c., a lead wheel, with a little fine rotten stone and water, is substituted. In *engraving* glass copper discs rotating in a lathe, and finely pulverized emery mixed with oil, are used to execute the outline and the ground; and for the polished work leaden discs, and very finely pulverized emery. Coarse engraving, however, is for the most part executed by means of the glass cutter's smoothing wheel.'—*Scientific Record of International Exhibition*, 1862.

GLASSES, OPTICAL. Glasses intended for optical purposes are ground to certain curved forms, and called lenses. They are either convex or concave, and are used for simple magnifiers and spectacles, or for telescopes and microscopes. The grinding of the lenses is performed in brass moulds, either concave or convex, formed to the same curvature as that desired in the lenses, and worked either by hand or by machinery. English artists, until recently, were unable to produce disks of glass for the formation of the object-glasses of large telescopes; but since the duty has been taken off glass, disks quite perfect, at least 25 inches in diameter, have been produced.

GLASS'WORT, a species of *Salicornia*, a shore plant containing much soda, and formerly collected for the purpose of obtaining that alkali from it.

GLAU'BERITE, a double sulphate of lime and soda, sometimes associated with rock-salt.

GLAU'BER'S SALT, in Chemistry, sulphate of soda, a well-known cathartic. It was first made by Glauber, in obtaining muriatic acid from common salt.

GLAUCO'MA (*Gr.*, from *glaukos*: grey), in Surgery, a disease in the eye, in which the crystalline humour has a greenish or bluish grey appearance, and its transparency is diminished.

GLAU'COUS (same *deriv.*), of a grey bluish colour; applied to leaves, &c., of plants which are covered with a fine mealiness, such as is seen on the underside of cabbage leaves.

GLA'ZING (*glasuren*, to glaze: *Ger.*), in the manufacture of pottery, the incrustation of vessels with a vitreous substance, the basis of which is lead. After the ingredients are ground together, they are calcined with a moderate heat, and, when cold, reduced to a powder, which is tempered with water, and laid on the ware by means of a brush. The violent heat of a furnace soon transforms this coating into a perfect glass.

GLEBE LAND (*gleba*, arable soil: *Lat.*), in Law, a portion of meadow or pasture land belonging to a parish church or ecclesiastical benefice.

GLEE (*gligge*, merriment: *Sax.*), in Music, a composition of three or more parts.

GLENE (*glēnē*, the ball of the eye: *Gr.*), in Anatomy, the cavity or socket of the eye and the pupil. Also any slight depression or cavity receiving a bone in articulation.

GLI'ADINE (*glia*, glue: *Gr.*), in Chemistry, a peculiar azotized substance, which with true vegetable fibrine constitutes gluten. The latter owes its adhesive property to gliadine, which, when dry, is a slightly transparent, brittle substance, of a straw colour.

GLI'RES (*glis*, a dormouse: *Lat.*), the rodent order of mammals, including the families of mice, porcupines, hares, jerboas, and mole rats. These animals have only two cutting teeth in each jaw, and there is a vacant space between these and the grinders. They have no canines. The jaws have the power of moving laterally. The toes are distinct and are furnished with small claws.

GLOBE (*globus*: *Lat.*), in practical Mathematics, an artificial spherical body, on the convex surface of which are represented the countries, seas, &c., of our earth, or the face of the heavens, with the several celestial circles. The former is called the *terrestrial*, and the latter the *celestial* globe. Their principal use, besides serving respectively to distinguish the earth's surface, and to mark the situation of the fixed stars, is to illustrate and explain the phenomena arising from the diurnal motion of the earth. They are, consequently, of the highest importance in acquiring a knowledge of geography and astronomy. [See EARTH, ASTRONOMY, &c.]

GLOBE FISHES. [See DIODON.]

GLOB'ULAR CHART (same *deriv.*), a name given to the representation of the surface or of some part of the surface of the terrestrial globe upon a plane, according to the principles of the *globular projection*. Its advantage is, that equal arcs of great circles are represented by straight lines, which are nearly equal. If the plane of projection is the equator, the different meridians will be represented by straight lines and the parallels of latitude by concentric circles. In general, however, the projection is made on the meridian, in which case the projections of the other meridians are ellipses.

GLOB'ULE (same *deriv.*), a small particle of matter of a spherical form; a word particularly applied to the red particles of blood, which swim in a transparent serum.

GLOM'ERATE (*glomero*, I form into a ball: *Lat.*), in Anatomy, an epithet for a gland, formed of a conglomeration of sanguineous vessels, having no cavity, but furnished with an excretory duct, as the lachrymal and mammary glands.

GLOSS (*glossa*, language: *Gr.*), at first, 'meant a word from a foreign language, or an obsolete or poetical word, or whatever required interpretation. It was afterwards used for the interpretation itself, and then it was extended to an entire expository sentence. The first glosses were interlinear: they were afterwards placed in the margin and extended finally, in some instances, to a sort of running commentary on an entire book. These were called apparatus.'— HALLAM.

GLOSSA'GRA (*glōssa*, the tongue; and *agra*, a catching: *Gr.*), in Medicine, a rheumatic pain in the tongue.

GLOSS'ARY (*glossarium*: *Lat.*; from *glōssa*, a tongue: *Gr.*), a dictionary or vocabulary, explaining obscure or antiquated words found in old authors.

GLOS'SOCELE (*glōssa*, the tongue: and *kēlē*, a tumour: *Gr.*), in Medicine, an extrusion of the tongue.

GLOT'TIS (*Gr.*, from *glōtta*, the tongue), in Anatomy, the narrow opening at the upper part of the larynx or windpipe, which, by its dilatation and contraction, contributes to the modulation of the voice.

GLOW'-WORM, the wingless female of a beetle, the *Lampyris noctiluca* of naturalists, remarkable for its luminous appearance in the dark. The glow-worm is seen about the months of June, July, and August. The light proceeds from the under side of the abdomen, and the insect can vary or suspend it at pleasure. The light-emitting segments preserve this power for some time after being separated from the rest of the body; and they manifest it *in vacuo*, and in atmospheres containing no oxygen. The male, which is winged and emits no light, has his head almost entirely occupied by his largely developed eyes.

GLUCI'NA (*glukus*, sweet: *Gr.*), a rare earth, discovered in 1797 by Vauquelin, and found, as yet, only in the emerald, beryl, and euclase. It derives its name from the sweetness of some of its salts.

GLUCI'NUM (same *deriv.*), or *Beryllium*, the metallic base of the earth glucina. It is of a dark grey colour, and is obtained by acting on the chloride of glucina with potassium.

GLUE (*gluten*: *Lat.*), a tenacious viscid matter, which serves as a cement. It is made from the parings of hides and other offals by boiling them in water, then straining off the impurities and boiling them again. The best glue is that which is oldest. Glue is impure *gelatine*.

GLUMES (*gluma*, chaff: *Lat.*), in Botany, the outer scales of the flowers of grasses. Each flower of the sedges has a solitary glume. These two families have been formed into a sub-class called *Glumaceæ*.

GLU'TEAL (*gloutos*, the buttocks; *Gr.*), in Anatomy, an epithet for what belongs to the buttock. Thus, the *gluteal muscles, arteries*, &c.

GLU'TEN (glue: *Lat.*), the viscid elastic substance which remains, when flour, wrapped in coarse cloth, is washed under a stream of water until all the soluble matters and starch are carried away. It exists in many kinds of grain and in some parts of other vegetables. The peculiar toughness and viscidity of wheat flour are due to it. There is more gluten in the wheat of warm than of cold climates. It contains nitrogen, and therefore, in some measure, approximates to animal matter: this causes it to give out a very disagreeable odour when putrefying. Dried in the air or in a stove, gluten diminishes considerably in size, becomes hard, brittle, glistening, and of a deep yellow colour. It is insoluble in ether, in fat, and essential oils, and nearly so in water.

GLU'TEUS (*gloutos*, the buttocks: *Gr.*), in Anatomy, the large and thick muscle upon which we sit. It serves to extend the thigh by pulling it directly backwards, and assists it in its rotary motion.

GLUT'TON (*glouton*: *Fr*; from *glutio*, I gulp down: *Lat.*), the *Gulo luscus*, of Zoologists, a carnivorous animal of the weasel tribe, found in the north of Europe, Asia, and America. It is sometimes called the wolverine. It grows to the length of three feet, but has short legs, and moves slowly. It is very cunning and voracious. In order to catch its prey it climbs a tree, and from that darts down upon its victim.

GLY'CERINE (*glukus*, sweet: *Gr.*), in Chemistry, a sweet liquid, one of the four proximate principles of oils and fats. It is set free in the process of saponification, and left behind, but in a very impure state, when the fat acid unites with the alkali in the formation of soap. It consists of carbon, hydrogen, and oxygen; and, when thrown on burning coals, takes fire like oil. Its spec. grav. when pure is 1·27. [See STEARIC ACID.] Water combines with it in almost all proportions; alcohol dissolves it easily; nitric acid changes it into oxalic acid.

GLYCO'NIAN, a verse in Greek and Latin poetry, consisting of three feet, a spondee, a choriamb, and a pyrrhic.

GLYPH (*glupho*, I hollow out: *Gr.*), in Architecture, any channel or cavity intended as an ornament.

GLYPHO'GRAPHY (*gluphē*, sculpture

and *graphē*, a writing: *Gr.*), an art by which the operations of drawing and engraving, which were formerly distinct, are combined in one. It consists in depositing upon a plate of metal a thin stratum of wax, or any other soft substance, on which a subject or design is engraved, the depth of the incisions being determined by the thickness of the soft coating The engraving thus made is subjected to the electrotype process, by which a sheet of copper or other suitable metal is deposited upon it. When this is detached it will exhibit in relief the engraving, and printed impressions may be produced from it in the same manner as from a woodcut to which it is analogous. ——Also, a description of the art of engraving on precious stones.

GLYP'TOTHEK (*gluptos*, carved; *theke*, a repository: *Gr.*), a name sometimes given to a gallery of sculpture, e g. the Glyptothek at Munich designed by Von Klenze.

GNAT (*gnæt*, from *gnagan*, to gnaw: *Sax.*), a name given to a number of dipterous insects the females of which are troublesome to man The common gnat is the *Culex ciliaris* of entomologists The gnat of this country is comparatively harmless; but those of warmer climates, known as mosquitoes, are peculiarly annoying, especially in marshy situations.

GNEISS (*Ger.*), in Geology, a rock composed of the same constituents as granite, viz. quartz, felspar, and mica, but arranged in layers and laminæ. Hence, it is often styled a foliated granite As to its origin, some geologists maintain that gneiss was at first a sedimentary rock—that is, was deposited by water—and that it was afterwards acted on by heat, which caused it to assume a crystalline structure. This is the metamorphic theory. Others think that it was derived from the disintegration of granitic rocks, and that the crystalline materials were then arranged in layers under water. Associated with gneiss are various other rocks of the same general nature, in which some of the mineral constituents are replaced by others; such as syenitic, gneiss, hornblende, schist, and mica schist. Gneissic rocks occur abundantly in Scotland, Norway, and Sweden, the Alps, the Andes, and the Himalayas. These rocks are utterly destitute of organic remains, but are often rich in metallic ores deposited in veins.

GNOMES (*Fr.*), spirits which were supposed to dwell in the interior parts of the earth, and to whose care mines, quarries, &c., are assigned.

GNO'MON (*gnōmōn*: *Gr.* The word literally signifies something that makes a thing known), in Astronomy, a style erected perpendicular to the horizon, in order to find the altitude of the sun.——In Dialling, the style or pin of a dial, which, by its shadow, shows the hour of the day. It represents the axis of the earth.——GNOMON, in Geometry, a figure formed by the two complements with either of the parallelograms about the diameter.

GNOMON'IC PROJECTION of a portion of a sphere, is that projection which supposes the eye to be in the centre of the sphere. Every great circle is thereby projected into a straight line, and this is peculiar to the gnomonic projection.

GNOMON'ICS (*gnomonikos*, relating to sun-dials; from last: *Gr.*), the art or science of dialling, or of constructing dials.

GNOS'TICS (*Gnōstikoi*, from *gnōsis*, knowledge: *Gr*), a sect of philosophers that arose in the first ages of Christianity, who pretended they alone had a true knowledge of the Christian religion. They formed for themselves a system of theology, agreeable to the philosophy of Pythagoras and Plato, and fancied they discovered deeper mysteries in the Scriptures than were perceived by those whom they considered as simple and ignorant They held that all natures, intellectual and material, are derived by successive emanations from the Deity. In process of time, the name designated sectarians of various descriptions, but who all agreed in certain opinions; and the tenet which seemed most particularly to distinguish them was the existence of two first principles, or deities, the one the author of good, and the other of evil.

GNU, a species of antelope, the *Connochetes gnu* of zoologists, having horns bent forward at the base and backward in the middle It is a native of Southern Africa, and its form partakes of that of the horse, the ox, and the deer. The gnu is a lively capricious animal; and when irritated, it expresses its resentment by plunging, curvetting, tearing the ground with its hoofs, and butting with its head These animals feed in large herds, and it is only when stragglers have been accidentally separated from the herd that any of them are found in a solitary state

GOAT (*gat*: *Sax.*), the name given to the members of a family of ruminant animals. The common goat is the *Hircus ægagrus* of naturalists The horns are hollow, erect, and scabrous. They delight in rocks and mountains, and subsist on scanty coarse food. The milk of goats is sweet and nourishing, and their flesh furnishes provisions to the inhabitants of countries where they abound. But the skin is the most valuable part of the animal. It is prepared for a variety of purposes, takes a dye better than any other, and is well known under the name of *morocco.* The *Cashmere goat*, from the hair of which are manufactured Cashmere shawls, is smaller than the common domestic goat. The Angora goat has a long, silky, fine hair, which is not curled; and it is also furnished with a soft, silky hair, of a silver-white colour, hanging down in long curling locks. The finest camlets are made from the wool of this goat.

GOAT'S-BEARD, a plant of the genus *Tragopogon*, nat ord. *Compositæ.*

GOAT'S THORN, the *Astragalus Tragacantha* of botanists, a plant of the nat. ord. *Leguminosæ*, growing in the south of Europe.

GOAT'-SUCKER, a passerine bird, the *Caprimulgus Europæus* of ornithologists. It is so called because it was supposed by the ancients to suck the teats of the goat but there is no foundation for this belief

It is also popularly known as the night-jar and fern owl. Like the owl, it is seldom seen in the daytime, unless disturbed, or unless the weather is dark and gloomy, when its eyes are not dazzled by the bright rays of the sun. Its mouth, which is of great size, fits it well for catching the night insects which are its prey.

GOBELINS, or HÔTEL-ROYAL DE GOBELINS, a celebrated academy for tapestry-drawing, and manufactory of tapestry, erected in the suburb of St. Marcel, at Paris, by Louis XIV. in the year 1667. The place was previously famous on account of the dyeing manufactory established there by Giles and John Gobelins in the reign of Francis I. They discovered a method of producing a beautiful scarlet, which has ever since been known by their name; and so extensive has been their fame, that not only the colour, but the house in which their business was carried on, and the river they made use of, are called *Gobelins*.

GO'BY (*gobius: Lat*; from *kōbios: Gr.*), the common name of some marine fishes belonging to the acanthopterygian genus *Gobius*, remarkable for having their ventral fins united.

GODS and GOD'DESSES of the ancient Romans. They were divided into *dii majorum gentium*, and *dii minorum gentium* (that is, into the superior and inferior gods); also, according to their place of residence, into celestial, terrestrial, infernal marine, and sylvan gods; and into animal and natural gods: the animal gods were mortals, who had been raised to divinity by ignorance and superstition; and the natural gods, parts of nature, such as the stars, the elements, mountains, rivers, &c. There were, besides, deities who were supposed to preside over particular persons: some had the care of women in childbirth; others, that of children and young persons; and others were the deities of marriage Each action, virtue, and profession had also its particular god: the shepherds had their Pan; the gardeners their *Flora*: the learned their Mercury and Minerva; and the poets their Apollo and the Muses.

GOD'WIT (*god*, good; and *wita* or *fita*, an animal: *Sax.*), the popular name of some grallatorial birds, allied to the snipes, and belonging to the genus *Limosa* of ornithologists. Two species are known in Britain, the black-tailed and the bar-tailed godwit; but both are migratory. They have long bills and legs; frequent marshes near the sea shore, and are esteemed great delicacies by epicures.

GOI'TRE (*Fr.*), in Medicine, a large tumour that forms gradually on the throat, between the trachea and the skin. It is an enlargement of the thyroid gland, and is known to medical men under the name of *bronchocele*. It is prevalent in several valleys of Switzerland, and in the mountainous parts of Brazil. Iodine is the most efficacious remedy. As to the cause of this complaint medical men are not agreed.

GOLD is the most ductile and malleable of all the metals. It is the heaviest metal except platina, its specific gravity being 19·3; and not being liable to be oxidised by air, it is well fitted to be used as coin. It is not sonorous when struck. The common acids do not act upon it; but it is dissolved by a mixture of nitric and hydrochloric acids, the *aqua regia* of the old chemists. Its equivalent is 197. Its lustre does not equal that of steel, platina, or silver, but it surpasses the other metals in this respect. It requires a strong fire to fuse it, remaining unaltered in the degree of heat that melts tin or lead, but a less powerful heat than is necessary to the fusing of iron or copper. It becomes ignited and white before it runs, and when in fusion, appears of a pale bluish-green colour on the surface. It amalgamates the most readily of all the metals with quicksilver. When in a state of fusion, it very easily and very intimately combines with silver, and, when mixed with that metal, will also run into a mass with iron. The malleability of gold is such that it may be reduced to a film having only the thickness of the 200,000th part of an inch, and one grain of it may be made to cover upwards of fifty square inches. As to ductility an ounce is capable of being extended in the form of wire to the length of many hundred miles. No metal destroys the malleability of gold so completely as lead: one two-thousandth part renders it too brittle for rolling, and its very fumes produce a serious effect upon it. Gold is found in beds of quartz, sandstone, &c., and also in many rivers, particularly in Peru, in minute and irregular grains, which are known by the name of *gold-dust*. The principal use of gold, as is well known, is in coinage It has been with mankind, from time immemorial, the representative of every species of property. Even before the art of coining was invented, it passed for money in the condition in which it was found in the earth; and in this form it is still current in many parts of Africa. It is rarely used in a state of perfect purity, but is almost universally alloyed with copper, or with silver, in order to increase its hardness. In expressing the fineness of an alloy of gold, the mass is supposed to be divided into twenty-four equal parts; and the number of these consisting of pure gold is expressed. Thus, our gold coin is twenty-two carats fine: that is twenty-two parts of it are gold, and two parts another metal—copper. Gold would be too soft if unalloyed. When silver is used, instead of copper, as an alloy, the coin is whiter. In Australia, the rocks containing gold are of Silurian age. The precious metal is found disseminated in veins of hard quartz [see REEF], or in the rocks adjacent to these veins. Upon these rocks lie deposits of tertiary age, consisting of clays, sands, and gravel. These deposits are frequently some hundreds of feet thick, and are evidently the remains of older strata, which have been denuded and re-deposited by the action of water. The miners term this series of beds drift or alluvial, and they excavate them to a great depth in their search for the disseminated gold, which is usually found most abundantly in the lowest bed, lying on the Silurian rocks. On their way to this bottom' bed, sheets of basalt are frequently passed through, sometimes fifty feet thick. In some places four or five sheets of basalt are met with in a depth of 300 or 400 feet, adding of course very greatly to the labours of the miners. Nuggets are only found in the alluvial beds. The reader will now understand the miner's distinction between 'Quartz mining' and 'Alluvial mining.'

GOLD'BEATERS' SKIN, the membrane of the intestine or blind gut of the ox, carefully prepared for the use of the gold-beater, who places the gold leaf between pieces of it when he is beating out the metal.

GOL'DEN FLEECE, in the mythological fables of the ancients, the fleece of the ram upon which Phryxus and Helle are supposed to have been carried over the sea to Colchis. When this ram was sacrificed to Jupiter, its fleece was hung upon a tree in the grove of Mars, guarded by two brazen-hoofed bulls, and a monstrous dragon that never slept; but was at last carried off by Jason and the Argonauts. [See ARGONAUTS.]

GOL'DEN NUM'BER, in Chronology, that number which indicates the year of the lunar cycle for any given time. It was called the Golden Number because in the ancient calendar it was written in letters of gold, on account of its great utility in ecclesiastical computations, especially in fixing the time of Easter. It was likewise called the Prime, because it pointed out the first day of the new moon, *primum lunæ*. To find the Golden Number, add 1 to the year of our Lord, divide the sum by 19, and the remainder, if any (or 19, if there is none), is the Golden Number; the quotient at the same time expressing the number of cycles which have revolved from the beginning of the year preceding the birth of Christ.

GOL'DEN-ROD, the *Solidago Virgaurea* of botanists, a plant belonging to the natural order *Compositæ*.

GOLD'FINCH, the *Fringilla Carduelis* of Ornithologists, a bird remarkable for its docility and pleasing song. The common goldfinch is very elegantly coloured, and is somewhat smaller than the sparrow. There are several other species of the genus, all remarkable for their plumage, sagacity, and melody.

GOLD-FISH', the *Cyprinus auratus*, a fish of a gold colour, and of the size of a pilchard. It was originally brought from China, and is now kept in small ponds, glass globes, or other vessels, by way of ornament. It is very prolific, and is easily bred, requiring scarcely any further attention than that of frequently changing the water.

GOLD-LEAF' or LEAF-GOLD', gold that is formed into a leaf, the thickness of which varies, according to the purpose for which it is designed. The gold is first reduced from the ingot to such a thickness that a square inch will weigh 6¼ grains; it is then cut into pieces about an inch square, which are placed between pieces of GOLD-BEATERS' SKIN [which see], and these again are placed between pieces of vellum and parchment. The hammers employed weigh from 8lb. to 16lb., and the beating takes place on a smooth block of marble. As the beating proceeds the leaf is divided into squares, and again beaten, until it has acquired the necessary degree of thinness. The finished leaves of gold are put up in small books made of soft paper, rubbed over with red chalk to prevent adhesion of the gold. An ounce of the metal may in this manner be made so thin as to cover 160 square feet; but it is more profitable to make it into only 100 square feet: there is less waste by broken leaves, and it is more useful to the gilder. The light transmitted through gold leaf is of a green colour.

GOLD-WI'RE, a cylindrical ingot of silver, superficially gilt, and afterwards drawn through a vast number of holes of different diameters to bring it to the requisite fineness, which is sometimes equal to that of a hair. Before each time of drawing, it is covered with wax, to preserve it from being worn away.——GOLD-WIRE FLATTED, the wire already described, flatted between rollers of polished steel, and used in spinning, weaving, lace-making, and embroidery.——GOLD THREAD, or *spun gold*, flatted silver-gilt wire, wrapped or laid over a thread of yellow silk, by twisting with a wheel and iron bobbins.

GO'LDYLOCKS, a name given to certain plants of the genus *Chrysocoma*. They belong to the natural order *Compositæ*, and are so called from their colour and appearance.

GOLF, a game with bat and ball, much practised in the north of England.

GOMPHO'SIS (*Gr.*, from *gomphos*, a wooden bolt for shipbuilding: *Gr.*), in Anatomy, a species of articulation, in which one bone is set in the other like a peg in a board: as the teeth within the jaws.

GOMU'TI, the *Borassus Gomutus*, a species of palm growing in the Indian islands.

GON'DOLA (*Ital.*), a boat used very much on the canals of Venice, being the conveyance employed in passing from one part of the city to another. It is about thirty feet long, and in the centre, where there is a small cabin for passengers, five wide. Gondolas are sharp pointed at both prow and stern, and are rowed with great velocity and skill by two men termed gondoliers. An ancient sumptuary law requires them to be furnished with black curtains, which give them a gloomy appearance.

GONG, or TAMTAM, a kind of cymbal used by the Chinese. It is made of a very brittle compound of copper and tin; which, however, the Chinese render malleable during manufacture, as the instrument always exhibits marks of the hammer.

GONIOM'ETER (*gōnia*, an angle; and *metron*, a measure: *Gr.*), an instrument for measuring solid angles, or the inclination of planes, but particularly those of crystals. Such an instrument is necessary to the mineralogist. Various forms have been contrived, but that best known in this country was invented by Dr. Wollaston.

GOOSE, an aquatic web-footed bird, belonging to the genus *Anser* of ornithologists. The *Anser ferus*, or grey goose, our common wild goose, is easily tamed; and from it has sprung the domestic breed of goose. There are several other species of wild goose that frequent the British islands.

GOOSE'BERRY, the fruit of the *Ribes grossularia*, of which many varieties have been produced by the gardener's art. Currant bushes belong to the same genus.

GOOSE'-FOOT, a wild plant, of the genus *Chenopodium*. [See CHENOPODIACEÆ.]

GOOSE'-NECK, in a ship, a piece of iron fixed on the end of the tiller, to which is fastened the lanyard of the whip-staff, or the wheel-rope for steering the ship.

GOOSE'WING, in seamen's language, a sail set on a boom on the lee side of a ship; also the clews or lower corners of a ship's mainsail or foresail when the middle part is furled.

GOR'DIAN KNOT, in Antiquity, a knot made by Gordius, king of Phrygia, so very intricate that there was no finding where it began or ended. An oracle had declared that he who should untie this knot would be master of Asia. Alexander having undertaken it, and fearing that his inability to untie it might prove an ill omen, cut it asunder with his sword, and thus either accomplished or eluded the oracle. Hence, in modern language, *to cut the Gordian knot* is to remove a difficulty by bold or unusual means.

GOR'DIUS AQUATICUS, the common *Hair Worm*, which derives its generic name from a habit of coiling itself into a knot. It is of the thickness of a hog's bristle, from six to ten inches long, and lives in stagnant water.

GORGE (*Fr.*), in Architecture, the same as *cavetto* [which see].——In Fortification, the entrance of a bastion, ravelin, or other outwork.

GOR'GED (*gorge*, a throat: *Fr.*), in Heraldry, bearing a crown, coronet, or the like, about the neck.

GOR'GET (same *deriv.*), armour attached to the helmet and covering the neck.

GOR'GONIA, a genus of flexible corals, usually much ramified, and more or less resembling a tree branch, or small bush. The horny axis of the stems and branches is coated with carbonate of lime, differently coloured in the different species, and this coating or bark is composed of SPICULA, cemented together by animal matter, and forming, when separated, pretty objects for the microscope. The whole is the work of zoophytes which reside in cells, the orifices of which are scattered over the bark.

GOR'GONS (*Gorgōn*, from *gorgos*, terrible: *Gr.*), in Mythology, three sister deities named Stheno, Euryale, and Medusa, who had hair entwined with serpents, hands of brass, winged bodies covered with scales, tusk-like teeth, and eyes so terrible that they turned everyone on whom they looked to stone. Perseus is said to have killed them with the aid of weapons lent him by Pluto and other deities. [See MEDUSA.]

GOS'HAWK (*gos*, goose; and *hafoc*, a hawk: *Sax.*), the *Falco* (or *Astur*) *palumbarius* of ornithologists, a voracious bird, very destructive to game. It is now very rare in the British islands, being almost confined to the highlands of Scotland. It was formerly employed in falconry.

GOS'PEL (*god*, good; and *spel*, a message: *Sax.*), a translation of the Greek *Euangelion*. The four books of the New Testament attributed to Matthew, Mark, Luke, and John, are called Gospels. In the first three centuries after Christ, many other gospels were in circulation; but, although the fathers of the church quoted passages from them, they did not assign a divine authority to them. Some of these apocryphal gospels are still extant. Several eminent critics have maintained that the three first gospels were derived from one original gospel afterwards lost.

GOS'SAMER, fine filmy threads that float in the air in calm clear weather, especially in autumn. They are most usually seen in stubble fields and on furze or low bushes. They are formed by spiders.

GOSSYP'IUM (*Lat.*), a genus of plants belonging to the nat. ord. *Malvaceæ*, including the species of cotton plants, most of which are Asiatic, but some are of American growth and culture. [See COTTON.]

GOTH'IC STYLE, in Architecture, characterized by the use of the pointed arch, and termed by the French the *Style ogival* (*ogive*, a pointed arch: *Fr.*). It was derived, through the *Romanesque*, from the corrupt Italian used in the latter period of the Roman empire. The Romanesque, which included some of the characteristics of the Gothic, and was a debased style that sprang from unskilful attempts to imitate the Roman, may be said to have been in use from about the year 800 until the latter end of the 12th century. Its leading features were, horizontal lines, massive walls pierced by comparatively small openings, semicircular arches over doors, &c., and semicircular vaultings, rows of small pillars placed as ornaments in the upper part of the walls, &c. The churches consisted of a nave and side aisles, which, with transepts, formed a cross; and the head of the cross was generally terminated by a semicircular and additional building called the *apsis*, which formed that part of the choir specially devoted to ecclesiastical ceremonies. Some have divided the Romanesque into the *Saxon*, *Norman*, *Lombard*, *Byzantine*, and other styles. Towards the end of the 12th century, however, great changes were introduced. The pointed arch, which distinguishes the true Gothic style, was then adopted, though at first there was an anomalous mixture of circular and pointed arches; a tendency to perpendicular lines became predominant: the towers were made light and lofty. The powers of mechanical construction were at length exhibited in the utmost perfection, the proportion between strength and burden being calculated with extraordinary precision, and the thrusts of the vaultings counteracted in the most ingenious and efficient manner—lightness and boldness being attained in the highest degree. Many believe the pointed arch to have been suggested by the interlacing of arches in the ornamentation of walls during the period of the Romanesque; and others, that it was derived from the East: but something closely resembling it is found in the ruins and monuments of Egypt and Assyria. [See ARCHITECTURE.]

GOUGE (*Fr.*), an instrument or tool, used by various artificers, being a sort of round chisel for cutting or hollowing out wood, &c.

GOURD (*gourde: Fr.*), the fruit of climbing herbaceous plants belonging to the nat. ord. *Cucurbitaceæ*, natives of hot countries. These fruits assume various strange shapes, and many are edible. The skin of the bottle gourd (*Lagenaria vulgaris*), and some other species, is so strong that it is employed to hold liquids.

GOUT (*goutte: Fr.*), or ARTHRITIS (*Gr.*, from *arthron*, a joint), in Medicine, a very painful disease, the principal seat of which is in the joints and ligaments of the feet. It is often periodical or intermitting. It is a disease which seldom attacks young people, and is attended with the secretion of the superfluous earthy matter, which is no longer necessary for the formation of the bones, but which, instead of being carried off by the proper channels, is deposited beneath the skin, or accumulates internally, thus producing chalk-stones and various internal concretions. It is very common among those who indulge in the pleasures of the table, and is sometimes hereditary; but females seldom have this disease.

GOV'ERNMENT (*gouvernement: Fr.*). If the governing power is vested in the hands of one, it is a *monarchy;* if in the hands of the nobility, an *aristocracy;* and if in the hands of the people, or those chosen by them a *democracy*. The *executive government* is the function of administering public affairs; the *legislative government*, that of making the laws. In England, the executive government is in the sovereign and his ministers; but the legislative government is in the parliament, that is, the king, lords, and commons, whence the constitution of England is denominated a *mixed government.*——GOVERNMENT, in Grammar, the influence of a word with regard to construction: as when established usage requires that one word should cause another to be in a particular case or mood.

GOV'ERNOR (*gouverneur: Fr.*), a contrivance used for regulating the action of the steam-engine. It usually consists of two heavy balls, fixed respectively on the lower extremities of two rods, having at their upper extremities hinges of some form that attach them to a vertical spindle, which is made to revolve by the steam-engine, water-wheel, &c., which is to be regulated. When the machinery is moving with the proper velocity, the rods and balls are carried round by the spindle at a regulated distance from it; but when the velocity becomes too high, the balls and rods are thrown out by centrifugal force; and this, to a greater or less extent diminishes the supply of steam to the steam cylinder by means of the throttle-valve, or of water to the water-wheel by lowering the sluice-gate, until the right speed is attained. If the motion becomes too slow, the balls descend below the proper position, which opens the throttle-valve of the steam-engine, or increases the supply of water to the water-wheel.

GRACE (*gratia*, favour: *Lat.*), DAYS OF, in Commercial Law, three days allowed for payment after a bill has become due.

GRACES, The, in Heathen Mythology, were three beautiful goddesses, Aglaia, Thalia, and Euphrosyne, who were the constant attendants of Venus, whose daughters they were by Jupiter or Bacchus.——GRACES, in Music, turns, trills, and shakes, introduced for the purpose of embellishment.

GRADA'TION (*gradatio*, a going step by step: *Lat*), in Logic, an argumentation, consisting of propositions so disposed that the attribute of the first is the subject of the second; the attribute of the second the subject of the third; and so on, till the last attribute comes to be predicated of the subject of the first proposition.——In Music, a diatonic ascending or descending succession of cords——In Painting, the blending one tint into another.

GRA'DIENT (*gradiens*, going step by step: *Lat.*), a technical term connected with railways, and indicating an inclined plane.

GRAD'UATE (*gradus*, a step: *Lat.*), one who has obtained a degree at a college or university.

GRADUA'TION (same *deriv.*), in practical Astronomy, the division of circular arcs into degrees, minutes, &c. It requires the greatest accuracy, and its proper execution supposes great mechanical skill.

GRAFT'ING, in Horticulture, the process of inserting a branch of one tree into the stock of another, so that it may receive nourishment from it, while at the same time it produces a new tree like the old one whence the graft was taken. The use of grafting is to propagate any rare kinds of fruits. All good fruits have been obtained accidentally from seeds. It is quite uncertain whether or not the seeds of these will produce fruit worthy of cultivation; but when shoots are taken from such trees as bear good fruit, no degeneration is to be apprehended. Generally speaking, all the species of one genus may be grafted on one another; but there are exceptions; thus, the apple cannot be usefully grafted on the pear. Species belonging to different natural orders can scarcely ever be grafted on each other. Hence, the nearer in affinity the scion and the stock, the better.

GRAIN (*Fr.; from granum: Lat.*), the generic name of the seeds of wheat, barley, oats, rice, &c. All kinds of grain contain nutritious particles of a similar character, although they vary, both in their quantity and in their mixture, in various grains: but their most valuable elements are—*gluten*, which affords the strongest nourishment for the animal body: *fecula* or *starch*, which, though not so nutritious as gluten, seems to render it more digestible; and a *sweet mucilage*, which is more nutritious than starch, but is small in quantity, and renders the grain liable to the vinous and acetous fermentation.——GRAIN, the integer of our system of weights. The troy pound contains 5760 grs., the avoirdupois 7000; the troy ounce 480 grs., and the avoirdupois ounce 437½.

GRAINS OF PAR'ADISE, the acrid seeds of various species of *Amomum*, plants allied to ginger. Their properties are intoxicating, but of a very deleterious character, and they are said to be frequently employed to give a false strength to spirits and beer.

GRAL'LÆ (stilts: *Lat.*, from their long legs), in Ornithology, an order of birds, divided into seven families, viz.: *Otitidæ*, bustards; *Charadriidæ*, plovers; *Gruidæ*, cranes; *Ardeidæ*, herons; *Scolopacidæ*, snipes; *Palamedeidæ*, screamers; and *Rallidæ*, rails.

GRAM'INA (*Lat.*), or GRASSES, the most numerous family of plants, common to all countries. They have neither calyx nor corolla, but in place of them imbricated scales called *paleæ* and *glumes*. An English meadow of natural grass often exhibits a hundred different species. But the most productive kinds have been specially cultivated, and fields are now sown, not only with true grasses, but with clover, trefoil, sainfoin, and lucerne, which the farmer calls grasses, but which belong to a very different order, that of *Leguminosæ*. The *true grasses* include wheat, rye, barley, oats, rice, Indian corn, and the sugar-cane; their chief characteristic being that their stems or culms are cylindrical and provided at intervals with knots, from each of which arises a long linear or lanceolate leaf, sheathing the stem for some distance.

GRAM'MAR (*gramma*, a writing: *Gr.*), the art which analyzes and classes the words in a language, which details its peculiarities, and furnishes rules, recognized by the best authorities, for its construction. General grammar teaches the principles which are common to all languages; and the grammar of any particular language teaches the principles peculiar to that language. Grammar treats of sentences, and of the several parts of which they are composed. Sentences consist of words, words of one or more syllables, and syllables of one or more letters; so that, in fact, letters, syllables, words, and sentences make up the whole subject of grammar. By means of inarticulate sounds beasts can give expression to certain feelings; but man is distinguished from the brute creation by the power of producing a much greater variety of sounds, and of attaching to each modification a particular meaning.——GRAMMAR also signifies a book containing the rules of this art, methodically digested.

GRAMME (*gramma*, a weight equal to two oboli: *Gr.*), the French integer of weight, equal to 15·438 English troy grains.

GRANDEE', a designation given to the highest nobility of Spain or Portugal.

GRAND JU'RY, a jury convened by the sheriff to examine the grounds of accusation against offenders, and the validity of indictments. Those against whom true bills are found by the grand jury are afterwards tried before a petty jury.

GRAN'ITE (*granit*: *Ger.*; from *granum*, a grain: *Lat.*), a rock of igneous origin composed of crystals of quartz, felspar, and mica, confusedly mixed together. The felspar is sometimes white, sometimes red. When it occurs in large crystals it is called porphyritic granite. There is a variety composed only of felspar and quartz, which on certain sections presents broken lines resembling Eastern characters, and hence it is called Graphic Granite. When hornblende takes the place of mica the rock is called *Syenite*. Granite is believed to have once been in a state of fusion in the interior of the earth and to have cooled slowly, under great pressure. Although granite is often found at the surface of the earth, some vast mountain ranges chiefly consisting of it, it is never found lying upon sedimentary rocks. It has evidently been found at widely distant epochs; for whilst it lies beneath the oldest fossiliferous rocks, it is found penetrating in the form of veins into rocks of the tertiary period. Granite is much used for building purposes. Some kinds however readily decay. From its disintegration in situ has been found the clay called *Kaolin* which is employed in the manufacture of porcelain. [See GNEISS.]

GRAN'ITEL (same *deriv.*), in Mineralogy, a granitic compound containing two constituents only; as quartz and felspar, or quartz and hornblende.

GRAN'ITIN (from *granite*), in Mineralogy, a granitic aggregate of three species of minerals, some of which differ from those species which compose granite; as quartz, felspar, and jade or shorl.

GRANT, in Law, a mode of conveyance by mere deed, and without livery of seisin, appropriate to estates in lands and tenements not in possession, and also to incorporeal hereditaments.

GRANULA'TION (*granum*, a grain: *Lat.*), the act of forming metal into grains. This is generally effected by pouring the metal in a fluid state into water. Should it require to be finely divided, it must be made to pass through a perforated ladle or sieve. If the particles are to be spherical, it must be poured from such a height that they will be cold before reaching the water; hence the great height of *shot towers*.——GRANULATIONS, in Medicine, the minute grain-like, fleshy bodies, which form on the surfaces of ulcers and suppurating wounds, and serve both for filling up the cavities and bringing nearer together and uniting their sides. The colour of healthy granulations is a deep florid red, and they always have a tendency to unite. When livid, they are unhealthy, and have only a languid circulation.

GRAPE (*grappe*, a bunch: *Fr.*), the fruit of the vine, growing in clusters, from which wine is expressed. The climate of England is not very favourable to their proper ripening, but the grapes we produce in hot-houses are generally superior to those which we import green from Malaga and other ports of Spain. When grapes are dried and preserved, they are called *raisins*; or, if they are the very small kind cultivated in Zante, Cephalonia, and Ithaca, and in the Morea near Patras, *currants*.

GRA'PE-SHOT, in Artillery, a combination of small shot put into a thick canvas bag, and corded so as to form a kind of cylinder. It is now superseded by *canister shot*.

GRAPH'ITE (*grapho*, I write: *Gr.*), in Mineralogy, Plumbago, or BLACK LEAD, which see.

GRAPHOM'ETER (*grapho*, I write; and *metron*, a measure: *Gr.*), a mathematical instrument, called also a *semicircle*, the use of which is to find the number of degrees in any angle, the vertex of which is at the centre of the instrument.

GRAP'NEL (*grapin: Fr.*), a small anchor fitted with four or five flukes or claws: it is used in boats or small vessels.

GRASS'HOPPER, a genus of orthopterous insects, distinguished from the crickets by the roof-like position of the wing-covers, and from the locusts by less robustness of body and greater length and slenderness of the legs, and antennæ. The grasshopper of our fields is harmless The stridulating sounds of the male insects is produced by rubbing the ridges of the inner surface of the thigh against the veins of the wing-cases

GRAU'WACKE (grey rock: *Ger*), an obsolete geological term, originating in Germany, for argillo arenaceous palæozoic strata.

GRAV'EL (*gravier Fr*), small stones or pebbles intermixed with sand. It is supposed to be derived from fragments of rocks and flints, worn by the action of water and by their mutual attrition, into rounded and other forms ——GRAVEL, in Medicine, a painful disorder, arising from a gritty matter concreting into small stones in the kidneys and bladder

GRA'VER (*graveur: Fr.*), the same as burin, which see

GRAVIM'ETER (*gravitas*, weight; and *metior*, I measure *Lat*), an instrument for determining the specific gravities of bodies

GRAVITA'TION (*gravitas*, weight *Lat*) The tendency of all the molecules of our system to move towards each other in proportion to their masses, and inversely to the square of their distances, is styled gravitation. It is this tendency which forms the bond by which the countless particles composing the universe are held together in their present arrangement and shape, and it equally regulates the descent of the minutest grain of dust to the ground, and the motion of the planets in their orbits Indeed, it reaches far beyond the bounds of our system, for there is reason to suppose that the binary stars are subjected to its laws. The force of gravitation varies directly as the masses of the gravitating bodies; for example, if one of two such bodies has a mass twice that of the other, then the attracting force of the former is twice that of the latter. It varies also inversely as the square of their distances; for example, if a given distance be made twice greater, the attracting force will be four times less. That manifestation of the force which takes place on or near the earth is styled terrestrial gravitation; and since it is the combined operation of every part of the globe that produces it, we may consider the attracting force to act only from the centre. Gravitation has the same intensity at all parts of the earth's surface, which are at equal distances from the centre The farther away a body is from that point the less is the gravitating force. Consequently that force is less intense on the top of a mountain than at the surface of the ocean, less at the poles than at the equator. That which we call weight is the effect of the gravitating force It is the pressure which the attraction of the earth causes a body to exert upon some other body interposed between it and the earth's centre *Weight* is proportional to mass *Absolute weight* is the relation which the pressure of a body bears to that of some other body, whose pressure is taken as unity. The absolute weight of bodies of similar constitution is proportional to their volumes Bodies which, with equal volumes, have different weights, have also different densities · that body which has the greater weight being more dense than another of the same volume but less weight The attracting force of the earth is strongly shown in the fall towards it of bodies left without support The direction of motion is towards the earth's centre Gravitation acts with equal intensity on all bodies, each particle of matter being equally attracted by the earth The cause of some bodies falling more rapidly than others is the resistance of the air, for a piece of gold and a feather are seen to fall with the same speed under an exhausted receiver. The motion of a falling body is uniformly accelerated, for the force which gave the motion a beginning is constantly acting upon it, and always with the same intensity; consequently at every instant it adds a new degree of speed to that which it has already communicated, and the velocity at the termination of its fall is composed of all the small increments of velocity added together Hence the greater the height of the fall, the greater the velocity at its termination It has been found that the final velocities increase as the times, that is, they follow the order of the numbers 1, 2, 3, 4, &c. A body in the latitude of London falls during the first second of its descent through 16 095 feet; during the second second through 48 285 feet, during the third second through 80 475 feet; during the fourth second through 112 665 feet, and so on The *total* space fallen through at the end of the second second is therefore 64 380 feet, at the end of the third second 144 855 feet, and at the end of the fourth second 257 520. Whence it appears that the spaces passed through in equal successive portions of time increase as the odd numbers 1, 3, 5, 7, &c.; whilst the total spaces fallen through increase as the square of the times 1^2, 2^2, 3^2, 4^2, &c. = 1, 4, 9, 16, &c.

GRAV'ITY (*gravitas*, weight: *Lat.*), CENTRE OF [See CENTRE *of gravity*.]

GRAV'ITY, SPECIFIC, is the weight of any kind of matter, considered with reference to that of an equal bulk of some other, which is assumed as a standard of comparison; and this standard, by universal consent, is distilled water at a certain temperature—in England, generally at 62° Fahr. Comparison may be made with distilled water at any temperature, if the allowance required by its altered density is taken into account. It happens that a cubic foot of distilled water weighs 1000 ounces avoirdupois. Consequently, assuming this as the specific gravity of rain-water, and comparing all other bodies with it, the numbers that express the specific gravity of bodies will at the same time denote the weight of a cubic foot of each in avoirdupois ounces; which is a great convenience in numerical computations. From the preceding definition we readily deduce the following laws:—1. In bodies of equal magnitude, the specific gravities are directly as the weights, or as their densities 2 In bodies of the same specific gravity, the weights will be as the magnitudes 3. In bodies of equal weights, the specific gravities are inversely as the magnitudes. 4. The weights of different bodies are to each other in the compound ratio of their magnitudes and specific gravities. Hence it is obvious that, of the magnitude, weight, and specific gravity of a body, any two being given, the third may be found; and we may thus ascertain the magnitude of bodies which are too irregular to admit of the application of the common rules of mensuration; or we may, by knowing the specific gravity and magnitude, find the weight of bodies which are too ponderous to be submitted to the action of the balance or steelyard; or lastly, the magnitude and weight being given, we may ascertain the specific gravities The specific gravity of a solid is found by weighing it first in air, and then while immersed in distilled water, or some fluid of known density which will not dissolve it. The weight lost by immersion is the weight of a quantity of fluid equal in bulk to the body. The weight of the body in air, divided by the weight lost, will be its specific gravity with reference to the fluid employed. If the body will not sink in the fluid, some substance that will make it sink must be attached to it. The effective part of the weight, added to the weight of the body, will be the weight of an equal bulk of the fluid; and dividing the weight of the body in air by this, will give its specific gravity with respect to the fluid. The most accurate and concise mode of ascertaining the density of liquids is to employ a small glass measure with a very short narrow neck, called a *specific gravity bottle*, and adjusted to hold exactly 1000 grains of distilled water. The vessel being counterpoised, and then filled with any other liquid, its weight is observed, and the density of its contents, compared with that of water, may be found by merely cutting off three decimal places. After each operation, the glass must be carefully rinsed with pure water, and again dried, by heating it, and then sucking out the humid air by means of a slender tube. The specific gravity bottle enables us to take the specific gravity of a body which is in powder—of a soil for instance. For this purpose, half the quantity of water the bottle would hold is to be placed in it; then just enough of the clay, &c., to cause it to be filled with the mixture; and it is then to be weighed. The weight of the water being deducted, the remainder will be the weight of the clay, &c.; and this, divided by half the weight of the water, which the bottle would hold, will be the specific gravity of the clay, &c. The specific gravity of fluids may also be ascertained by the *hydrometer*, which see.

GRAY'LING, a fresh-water fish belonging to the *Salmonidæ*, the *Thymallus vulgaris* of Ichthyologists. It is of a brownish colour, with several dusky stripes along the sides. When fresh from the water it is slightly varied with blue, green, and gold, and a few dark spots. It is found in some parts of England; but abundantly in clear rapid streams in the north of Europe; and it is much esteemed as food.

GRAY'WACKE. [See GRAUWACKE]

GREAVE (*grève: Fr;* in *Burgund. Fr.*, a shin), a piece of armour, fitted to the front of the leg. It was used both by the Greeks and Romans, but on one leg only, as the other was protected by the shield

GREBE, the common name of some birds belonging to the genus *Podiceps*, of ornithologists. They are divers, and placed in the family *Colymbidæ*. The toes are not completely webbed, but have a scalloped membrane at each side like the coots. The little grebe or dabchick is the commonest in these islands

GREEK CHURCH, that section of Christians who conform, in their creed, usages, and church government, to the form of Christianity introduced into the Greek empire about the fifth century, and brought to its present state under the patriarchs of Constantinople, Alexandria, Antioch, and Jerusalem. The bishops of Constantinople and Rome were long rivals, each attempting to obtain universal supremacy: the former being impeded in their efforts by their proximity to the emperors, the latter ultimately attained their object. The first dispute on matters of doctrine between the rival churches occurred in the 9th century. The Greeks denied the procession of the Holy Ghost from the Father *and the Son;* the Latins asserted and defined it as an article of faith. The latter, however, continued powerful in the East until A D. 1054, when a final separation took place. Like the Roman Catholic, this church recognizes two sources of doctrine, the Bible and tradition, under which last it comprehends not only those dogmas which were orally delivered by the apostles, but also those which have been approved by the fathers of the Greek church. It is the only church which holds that the Holy Ghost proceeds from the Father only, thus differing from the Roman Catholic and Protestant churches, which agree in believing the Holy Ghost to proceed from the Father and the Son. Like the Catholic church, it has seven sacraments: baptism, confirmation, the eucharist — preceded by confession — penance, ordination, marriage, and extreme unction; but it is peculiar in holding that full purification from original sin in baptism requires an immersion three times of the whole body in water, whether infants or adults are to be baptised, and in joining confirmation with baptism as its completion. It scarcely can be said to admit the doctrine of purgatory, has nothing to do with pre destination, works of supererogation, indulgences, and dispensations; it allows pictures, but forbids images; permits the marriage of its secular priests; adopts auricular confession, and holds that doctrine of Christ's presence in the eucharist called consubstantiation, which see; and it recognizes neither the pope nor anyone else as the visible vicar of Christ on earth, giving to the patriarchs of Constantinople, however, a spiritual supremacy. In the invocation of the saints, in their fasts, relics, &c., the Greeks are as zealous as the Roman Catholics; it may be said, indeed, that the services of the Greek church consist almost entirely of outward forms. This form of Christianity is the religion of Russia, Greece, Moldavia, and Wallachia, and of congregations scattered throughout the provinces of the Turkish and Austrian empires.

GREEK FIRE, a combustible composition, invented by the Greeks in the middle ages, during their wars with the Arabs and Turks. It is supposed to have consisted of bitumen, or asphaltum, nitre, and sulphur. Many extraordinary accounts are given of its destructive effects. Bomb-shells are now-a-days sometimes filled with a combustible matter termed Greek fire, composed of naphtha and phosphorus, or with the bisulphide of carbon and phosphorus. This forms a very destructive missile: for when the shell explodes, the composition ignites spontaneously and cannot be extinguished with water.

GREEK LAN'GUAGE. The language of the primitive inhabitants of Greece, the Pelasgic, was already extinct in the time of Herodotus, if we may believe his assertion that it was different from the Hellenic. From the great number of Hellenic tribes of the same race, it was to be expected that there would be different dialects; and it is customary to distinguish three principal ones, according to the three leading branches of the Greeks, the Æolic, the Doric, and the Ionic, to which is added the Attic. At what time this language first began to be expressed in writing has long been a subject of doubt. According to the general opinion, Cadmus, the Phœnician, introduced the alphabet into Greece. His alphabet consisted of but sixteen letters; four more are said to have been invented by Palamedes in the Trojan war, and four by Simonides, of Ceos. As the Ionians first adopted these letters, the alphabet with twenty-four is called the *Ionic*. In Homer's time all knowledge, religion, and laws, were preserved by memory alone, and for that reason were clothed in verse, till prose was introduced with the art of writing. In Poetry the chief writers were Homer (long the reputed author of the Iliad and the Odyssey, but his individuality has been doubted); Hesiod, who wrote the 'Works and Days,' more than 800 years B.C.; Sappho, Alcæus, and Anacreon, writers of lyrics in the sixth century B.C.; Simonides, another writer of lyrical pieces; Pindar, who composed odes; Æschylus, Sophocles, and Euripides, who wrote tragedies; and Aristophanes, a writer of comedies; these flourished in the fifth century B.C.; Bion, Moschus, and Theocritus, who wrote idyls; Callimachus, hymns and epigrams, in the third century B.C. In other departments of literature, the following were the leading men whose writings have survived: Herodotus and Thucydides, both historians in the fifth century B.C.; Xenophon, the historian; Isocrates, Demosthenes, and Æchines, orators; Plato and Aristotle, philosophers, in the fourth century B.C.; Euclid and Apollonius, mathematicians, in the third century B.C.; Polybius, the historian, in the second century B.C.; Diodorus Siculus, the historian, in the first century B.C.; Strabo and Pausanius, geographers; Plutarch, the biographer; and Epictetus, the philosopher, in the first century after Christ; Lucian, a writer of dialogues; Ptolemy, the geographer; Arrian, the historian; Galen, the physician; and M. Aurelius Antoninus, the philosopher, in the second century after Christ. In this and the following centuries flourished the Fathers of the Church (see **FATHERS**), and a number of minor writers on Greek, whom want of space obliges us to pass by, except Heliodorus, who, in the fourth century of our era, wrote 'Theagenes and Chariclea,' the first of extant novels.——MODERN GREEK or ROMAIC. The Greek language seems to have preserved its purity longer than any other known to us. But this majestic dialect ceased to exist as a living language when Constantinople was taken by the Turks in A.D. 1453, and in the lower classes only did the common Greek survive the dialect of the polished classes. But the liberation of Greece has done much to revive the knowledge of its noble tongue in the regions in which it was originally spoken. The downfall of the Eastern empire, by scattering learned exiles through all parts of Europe, spread the knowledge of it in every land. The Romaic or modern Greek, like the Italian or modern Latin, differs from the ancient chiefly in having exchanged the terminations of the different cases, &c., for prepositions. In it, also, accents are confounded, and, though marked, are not noticed in pronunciation; diphthongs, anciently distinct, have the same pronunciation, *ει*, *οι*, *ί*, and *υ*, being pronounced *ί*; the form and signification of ancient words are changed in various ways, the dual number and oblique cases are lost; auxiliaries *have* and *will* are employed to indicate the past and future; personal pronouns are used with verbs; and orthography is without fixed rules. But it differs less from the original Greek than the Italian from the Latin. The use of the ancient Greek liturgy tended to preserve the language, and kept it from becoming different in different districts. The dialect of the common people is the least corrupt; that of Attica is the worst. The ancient letters are still used.

GREEN-CLOTH, BOARD OF, a court of justice belonging to the royal household, and held in the queen's palace, under the lord-steward. To this court are committed the accounts of expenses and payments to the queen's servants; and its jurisdiction extends to all offences committed in the royal palaces, and within the verge of the court, which reaches 200 yards from the palace gate every way. None of the royal household can be arrested for debt without a warrant from this board.

GREENFINCH, a British bird belonging to the finch family, the *Coccothraustes chloris* of ornithologists. The feathers are of a greenish hue, and the wings and tail variegated with yellow.

GREENHOUSE, in Horticulture, a glazed building, erected for sheltering and preserving the tender exotic plants, which will not bear to be exposed to the open air during the winter season. [See CONSERVATORY.]

GREENSAND, in Geology, fossiliferous beds belonging to the cretaceous formation. The Upper Greensand lies upon the gault, and belongs to the upper division of the cretaceous series. The Lower Greensand is under the gault, and belongs to the Neocomian or lower division of that series. The Upper Greensand chiefly consists of the fragments of some chloritic mineral. In some places there are bands of siliceous limestone and calcareous sandstone. The whole is about 100 feet in thickness in the Isle of Wight. The Lower Greensand varies greatly in its mineral composition, but it appears to have been principally derived from the wearing down of plutonic rocks. In the Isle of Wight it attains a thickness of 843 feet.

GREEN'STONE, in Geology a volcanic rock composed of a granular mixture of hornblende and felspar, or of augite and felspar. It is intermediate in composition between basalt and trachyte.

GREGO'RIAN CAL'ENDAR, in Chronology, a correction of the Julian. In the latter, every secular or hundredth year is bissextile: in the former, every one in four. This reformation of the calendar, which was made by pope Gregory XIII. A.D. 1582, is also called the *New Style*. [See STYLE.]

GRENA'DE (*Fr.*), a hollow shell or globe of iron, filled with combustibles, discharged from a howitzer. There is also a smaller kind, thrown by hand, which are called *hand-grenades*. These were originally used by soldiers who, from long service and distinguished bravery, were selected for the service; and hence the name of the *grenadiers*, who now form the first company of a battalion.

GREN'ATITE, a mineral of a dark reddish brown colour, sometimes called *prismatic garnet*, and *staurotide*. It is composed of silica, alumina, and oxide of iron. It occurs imbedded in mica slate, and in talc, and is not fusible by the blowpipe. It sometimes occurs crystallised in the form of a cross, and it is then made a religious amulet.

GRIF'FIN (*griffon*: *Fr.*), an imaginary animal, with four legs, wings, and a beak; being in the upper part an eagle, and in the lower a lion. The ancients intended by this combination to give an idea of strength and swiftness, united with an extraordinary vigilance in guarding whatever was intrusted to its care. It was supposed to watch over mines of gold and hidden treasures, and was consecrated to the sun.

GRIS'AILLE (*Fr.*). A picture is said to be *en grisaille* when it is executed only in white and grey.

GRISET'TE (*Fr.*), originally a dress of coarse grey cloth, worn by females of the lower classes in Paris; hence it is used for the females themselves.

GROAT, an ancient silver coin, worth about fourpence of our money. At the time of the Conquest, the French *solidus* began to be called a shilling, and the Saxon *shilling* a groat.

GROS'BEAK, a name given to several British birds in the family of finches, on account of their short thick bills. They are nearly related to the common bullfinch.

GROSS (*gros*: *Fr.*), in Commerce, twelve dozen.——GROSS WEIGHT, the weight of merchandise or goods, with the dross, the bag, cask, &c., in which they are contained, for which an allowance is to be made of tare and tret. These being deducted, the remainder is denominated *neat* or *net* weight.——ADVOWSON IN GROSS, in Law, an advowson separated from the property of a manor, and annexed to the person of its owner.

GROS'SULAR (*grossulus*, a small unripe fig: *Lat.*), in Mineralogy, a rare kind of garnet, so named from its green colour. It is found in Siberia.

GROTES'QUE (*Fr.*), in the Fine Arts, a term applied to a combination of capricious ornaments, consisting of figures, animals, leaves, &c., which, as a whole, have no existence in nature. 'The true grotesque (says Mr. Ruskin), being the expression of the *repose* or *play* of a *serious* mind, there is a false grotesque opposed to it, which is the *full exertion* of a frivolous one.'——In Architecture, artificial grotto work, decorated with shells, rock, &c.

GROUND (*grund*: *Sax.*), in Etching, a composition spread over the surface of the metal to be etched, to prevent the nitric acid from eating except where the drawing has been made.——In Music, the name given to a composition in which the bass, consisting of a few bars of independent notes, is continually repeated to an ever-varying melody.——In Painting, the surface on which figures or other objects are represented.——GROUND-ICE, ice formed under peculiar circumstances, at the bottom of running water, in consequence of the ground being cooled by radiation, below the freezing point of water.——GROUND-IVY, the *Glechoma hederacea*, a British labiate plant.——GROUND-PLATES, in Architecture, the lower portions of a timber, which receives the principal and other posts.——GROUND-PLOT, the ground on which a building is placed.——GROUND-RENT, rent paid for the privilege of building on another man's ground, and generally on a long lease.——GROUND-SWELL, an undulation of the ocean, caused by a distant gale of wind.——GROUND-TACKLE, in ships, the ropes, &c., belonging to anchors.

GROUND'SEL, a name given to several wild plants belonging to the genus *Senecio*, nat. ord. *Compositæ*.

GROUP (*groupe*: *Fr.*), in Painting and Sculpture, an assemblage of figures or other objects.——GROUPING is the art of so combining and balancing the parts as to produce an harmonious effect.

GROUSE, the name of several species of game birds, belonging to the family of Tetraonidæ. In Britain there are the wood-grouse, or capercaillie, the black-grouse, the red or common grouse, and the white-grouse, or ptarmigan. They are shy, and wild birds living in forests or on moors.

GRUB (*graban*, to dig: *Sax.*), the worm or maggot produced from a beetle, which afterwards becomes a winged insect.

GRYL'LUS (*Lat.;* from *grullos*, literally a small pig; *grulizo*, I grunt: *Gr.*), in Entomology, a genus of saltatorial orthoptera, including our great green grasshopper *Gryllus viridissimus*.

GUAI'ACUM (*guayacan: Span.;* from *hoaxacan: Ind.*), in Botany, a genus of West Indian trees, nat. ord. *Zygophyllaceæ*, which yield a resinous matter used in medicine, called *Guaiacine*.

GUAN'ACO (*Peruv.*), the local name of the wild llama, the *Llama guanacus* of naturalists. It is the characteristic quadruped of the plains of Patagonia. [See LLAMA.]

GUA'NO (the corrupted Spanish form of a native Peruvian word), a substance which is found in large quantities on islands near the east coast of South America, and other parts of the world. It is the accumulated excrement of sea birds with the decayed bodies of seals, fish, birds &c.; and is such an excellent manure, that it forms an extensive and profitable branch of commerce. The value of different guanos depends upon the quantities of ammonia and phosphoric acid they respectively contain. Upwards of 240,000 tons are annually imported and used in this country.

GUARANTEE' (*garantie: Fr.*), an undertaking or engagement by a third party, that the stipulations of a treaty, or the engagement or promise of another, shall be performed. A person is not liable on a special promise in the nature of a guarantee, unless a written agreement or memorandum of such promise shall be signed by the party making the promise, or some person authorized by him. It is not necessary that the *consideration* for such promise should appear in writing, or be capable of inference from a written document.

GUARD, NA'TIONAL, of France, an institution devised in 1789, and fully organized in 1791. It was raised by voluntary enlistment, and consisted of one man out of every twenty citizens. Its staff was dissolved in 1795, and it was placed under the control of the military authorities. Under the restoration, it was deprived of the privilege of choosing its own officers, and in consequence of its demanding the dismissal of the ministry, it was dissolved in 1827.——IMPERIAL GUARD. When Napoleon became emperor, in 1805, he augmented the consular guard, which then consisted of 3300 infantry and 2100 cavalry, besides artillery and marines. It was an institution of great efficiency, consisting exclusively of soldiers who had served four years in the line, or of those who had belonged to what was called the *Young Guard*. In 1812, both guards consisted of 56,000 men. At the restoration, the soldiers of the young guard were transferred to the line, and the old guard was formed into regiments.

GUARD'ANT (*gardant*, guarding: *Fr.*), in Heraldry, having the face turned towards the spectator, as it were in a posture of defence.

GUARD'IAN (*gardien: Fr.*), in Law, a person charged by will or by the Court of Chancery with the custody of such persons as are incapable of self-guidance, and especially of minors.——GUARDIAN *ad litem*, a person appointed by the court to prosecute or defend a suit on behalf of infants.

GUARD'SHIP, a vessel of war, intended to superintend the marine affairs of a harbour or river; to take care that the ships not in commission have their proper watchword duly kept, by sending her guard-boats round them every night; and to receive seamen who are impressed in time of war.

GUARDS (*gardes: Fr.*), in a particular sense, the troops that are designed to guard the royal person and palace, and which consist both of horse and foot. In Britain the household troops or guards consist of two regiments of life-guards, the royal regiment of horse-guards, and three regiments of foot-guards, viz. the Grenadier, Coldstream and Scots Fusilier Guards. The actual body-guard of the sovereign on ordinary occasions consists of the *Yeomen of the Guard*, a corps originally established by Henry VII. in 1485. There are at present 140 yeomen, officered by a captain, a lieutenant, an ensign, and four exons. The captain is a nobleman, who is appointed by the ministry, and retires from office along with them.——From the earliest times, sovereigns have had a body of soldiers, designed especially to defend their persons. Alexander the Great had a corps of *Argyraspides* or silver shields; the Roman emperors had their *Prætorian* guards; the kings of France had their *Scotch* and afterwards their *Swiss* guards. The pope had, and continues to have, Swiss guards.

GUA'VA, American trees of the genus *Psidium*, nat. ord. *Myrtaceæ*. The fruit is round like an apple, with a pulpy interior containing many seeds. The flavour is agreeable, and from it is prepared a much esteemed jelly.

GUDG'EON (*goujon: Fr.*), a well-known fresh-water fish, the *Gobio fluviatilis* of naturalists. It belongs to the *Cyprinidæ*, and is distinguished from the barbel by having only two filaments or barbules at the mouth, and by having no strong bony ray at the commencement of the dorsal fin.

GUE'BRES (infidels: *Pers.*), a Persian sect, who still worship fire as an emanation or emblem of the Deity. A colony of them has been long established at Bombay and other parts of India, and has attained to riches and distinction: these are termed *Parsees*, on account of having sprung from the Persians. The sacred books of the Guebres are termed the *Zend Avesta*.

GUELDER ROSE, a wild British shrub with white flowers and deciduous leaves, the *Viburnum opulus* of botanists, nat. ord. *Caprifoliaceæ*.

GUELFS or **GUELPHS**, the name of a family, composing a faction formerly in Italy, whose contests with a rival faction, called the *Ghibelines*, were the cause of much misery and bloodshed. The wars of the Guelfs and Ghibelines became a struggle between the spiritual and secular power. The popes, who endeavoured to compel the German emperors to acknowledge their supremacy, and the cities of Italy, struggling for independence and deliverance from the oppressive yoke of these same emperors, formed the party of the Guelfs. Those who favoured the emperors were called Ghibelines. The contests of the Guelfs and Ghibelines originated in a German feud in the 12th century. The dukes of Bavaria, of the great house of Guelph, carried on a war against the house of Hohenstauffen, one of whose castles, *Weiblingen*, gave the name of Ghibelines to their party. When the Emperor Frederic I., the head of the latter, invaded Italy, to reassert the rights of the empire, these names were transplanted into that country. In the 14th century, the papal see was removed to Avignon, and, from that time, the original principles of these factions were lost; but they disturbed Italy until near the end of the 15th century.

GUILD (*gildan*, to pay: *Sax.*), a company, fraternity, or corporation, associated for some commercial purpose; of which every member was to pay something towards the common expenses. The guilds of the Anglo-Saxons, unlike those of more modern times, were not confined to mercantile purposes. They became ultimately so powerful, in London and other places, that admission into them was necessary as a qualification for the exercise of municipal rights.

GUILD'HALL (*gilde*, a corporation: *Ger.*), the chief hall of the city of London, for holding courts, and for the meeting of the lord-mayor and commonalty, in order to make laws and ordinances for the welfare and regulation of the city.——**GUILD-RENTS**, rents paid to the crown by any guild or fraternity: or those that formerly belonged to religious houses, and came to the crown at the general dissolution of monasteries.

GUIL'LOTINE, an instrument of public execution, for beheading persons at one stroke; adopted in France during the period of the revolution, and still employed in France when capital punishment is inflicted. It consists of a heavy knife, guided in its descent by grooves. The invention of this decapitating machine has been erroneously ascribed to Guillotin, a French physician. It was used long before in other places; thus, in Italy, for beheading persons of noble birth, under the name of *Manuaja*; and even in Scotland, under the name of *Maiden*. It was merely proposed by Guillotin, and adopted by the Convention, as being less cruel to the sufferer, and less ignominious for the family of the person executed; and the first criminal suffered by it at the *Place de Grève*, May 27th, 1792. It is also a vulgar error, that Guillotin was the first who perished by it: he survived until 1814.

GUIN'EA, an English denomination of money, and formerly a gold coin weighing 118·7 grains, first coined in the reign of Charles II. Its value is 21*s*. It was so called because it was made from gold that was brought from Guinea, on the coast of Africa.

GUIN'EA-FOWL, the *Numida Meleagris* of ornithologists, an African bird, now common in Europe, belonging to the order of *Gallinæ*. It is similar in its habits to our domestic poultry. Its colour is a dark grey, beautifully variegated with small white spots. Its head is bare of feathers, and covered with a naked bluish skin; on the top is a callous conical protuberance, and on each side of the upper mandible, at the base, hangs a loose wattle, which, in the female, is red, and in the male bluish. It makes a harsh unpleasant cry.

GUIN'EA-PIG, the *Cavia Cobaya* of Zoologists, a beautiful little rodent quadruped, a native of South America, but now domesticated in Europe. It is seven or eight inches long, and of a white colour, variegated with black and orange spots.

GUIN'EA-WORM. [See FILARIA.]

GUITAR' (*guitare*: *Fr.*; from *cithara*, a lute: *Lat.*), a musical stringed instrument, rather larger than a violin, and played with the fingers. It is much used in Spain and Italy, particularly in the former country, where there are few, even of the labouring class, who do not amuse themselves with it.

GULES (*gueule*, the mouth: *Fr.*), in Heraldry, the red colour equivalent to ruby, among the precious stones, and Mars among planets. It is represented by vertical lines in engraving.

GULF (*golfe*: *Fr.*), in Geography, a broad capacious bay, which, when very extensive, takes the name of a sea; as, the gulf of Venice, which is also called the Adriatic sea. A *gulf* and a *bay* differ only in extent; we apply *bay* to a large or small recess of the sea, but *gulf* is applied only to a large extent of water.——It also means a deep cavity in the earth, and a whirlpool.

GULF-STREAM, a current of warm water, which issues from the basin of the Mexican gulf and Caribbean sea, doubles the southern cape of Florida, and takes a north-eastern direction, in a line nearly parallel with the American coast. It touches the southern borders of the great banks of Newfoundland, and gradually diffuses itself until it is lost in the North Atlantic. At first the waters are intensely blue, with a temperature of 85° F., and have a velocity of four miles an hour. The dampness of our climate, and its winter mildness compared with North America in a corresponding latitude, are owing to the Gulf-stream. Much has been written as to the theory of this flow of water, but no suggestion of a cause has yet commanded universal assent.

GUN'-COTTON, the pyroxilin or trinitrocellulose of chemists, is a highly inflammable and explosive substance, discovered by Schönbein. It is a compound of carbon, hydrogen, and oxygen. It is obtained by steeping clean cotton wool in a mixture of the strongest sulphuric and nitric acids in equal proportions; and then thoroughly washing and cautiously drying it at a temperature of 212°. The original appearance of the cotton is little changed, saving that it has increased about 70 per cent. in weight. But it has now become explosively inflammable; and, when ignited by a spark, it flashes off with greater rapidity and energy than gunpowder. When properly prepared it does not become ignited until raised to a temperature of 277° F. Its value in gunnery as a substitute for gunpowder has been much debated, but a recent report, embodying the result of experiments, is highly favourable. The following is the substance of the report:—One pound of gun-cotton produces an effect exceeding three pounds of gunpowder in artillery. It may be placed in store, and preserved with great safety. The danger from explosion does not arise until it is confined. It may become damp, and even perfectly wet, without injury, and may be dried by mere exposure to the air. This is of great value in ships of war; and in case of fire the magazine may be submerged without injury. Gun-cotton keeps the gun clean, and requires less windage, and, therefore, performs much better in continuous firing. In gunpowder there is 68 per cent. of refuse, while in gun-cotton there is no residuum, and, therefore, no fouling. From the low temperature produced by gun-cotton the gun does not heat. The absence of fouling allows all the mechanism of a gun to have much more exactness than where allowance is made for fouling. The absence of smoke promotes rapid firing and exact aim. There are no poisonous gases, and the men suffer less inconvenience from firing. The fact of smaller recoil from a gun charged with gun-cotton is established by direct experiment. Its value is two-thirds of the recoil from gunpowder, the projectile effect being equal. The comparative advantage of gun-cotton and gunpowder for producing high velocities is shown in the following experiment with a Krupp's cast-steel gun, 6-pounder:—Ordinary charge, 30 ounces powder, produced 1338 feet per second: charge of 13½ oz. gun-cotton produced 1563 feet. The fact of the recoil being less in the ratio of two or three enables a less weight of gun to be employed, as well as a shorter gun. Bronze and cast-iron guns have been fired 1000 rounds without in the least affecting the endurance of the gun. From a difference in the law of expansion there is an extraordinary difference of result in the explosion of shells—namely, that the same shell is exploded by the same volume of gas into more than double the number of pieces. This is to be accounted for by the greater velocity of explosion when the gun-cotton is confined very closely in small spaces. It is also a peculiarity that the stronger and thicker the shell the smaller and more numerous the fragments into which it is broken. The fact that the action of gun-cotton is violent and rapid in exact proportion to the resistance it encounters, tells us the secret of the far higher efficiency of gun-cotton in mining than gunpowder. The stronger the rock the less gun-cotton comparatively with gunpowder is found necessary for the effect—so much so, that while gun-cotton is stronger than gunpowder, weight for weight, as three to one in artillery, it is stronger in the proportion of 6·274 to one in strong and solid rock, weight for weight. Its power in splitting up the material can be exactly regulated. It is a well-known fact that a bag of gunpowder nailed on the gates of a city will blow them open. A bag of gun-cotton exploded in the same way produces no effect. To blow up the gates of a city with gun-cotton it must be confined before explosion; 20 lbs. of gun-cotton, carried in the hand of a single man, would be sufficient, only he must know its nature. In a bag it is harmless; exploded in a box it will shatter the gates to atoms. A strong bridge of oak, of 24 feet span, was shattered to atoms by a small box containing 25 lbs. of gun-cotton laid on its centre. The bridge was not broken—it was shivered.

GULL, the name of some web-footed sea birds belonging to the genus *Larus*. They are found in every part of the world, and often met with many leagues from land. Gulls are voracious, and devour almost everything that comes in their way, whether fresh or putrid; yet they can endure hunger for a long time. There are thirteen species frequenting our shores.

GUM (*gomme: Fr.*), a vegetable product, which forms a viscid solution with water, but is insoluble in alcohol, ether, and oils. Strong sulphuric acid changes it into oxalic and mucic acids. It is exemplified by gum-arabic.

GUM-AR'ABIC, a gum which flows from the *Acacia Arabica*, and *Acacia vera*, which grow on the banks of the Nile, and in Arabia. It is transparent, without smell, and white, or with a yellow or brownish tint. It is used in medicine and the arts.

GUM'-LAC, a resinous substance, produced by the puncture of a female insect, a *Coccus*, upon the branches of several plants, among others the *Croton laccіferum*, or Bihar tree, growing in Siam, Assam, &c. The twig becomes incrusted with a reddish mammillated resin, which has a fracture of a crystalline appearance, and constitutes the *stick-lac* of commerce. The incrustation is often a quarter of an inch thick. The resinous concretion taken off the twigs, coarsely pounded, and triturated with water in a mortar, to remove most of the colouring matter, and dried in the sun, is *seed-lac*. The seed-lac is put into oblong bags of cotton cloth, which are held over a charcoal fire, and twisted so as to strain the liquefied resin through, and make it drop and form thin plates, which constitute *shell-lac*.

GUM'-RESIN, an exudation from many trees, such as olibanum or frankincense, galbanum, scammony, gamboge, euphorbium, asafœtida, aloes, myrrh, and gum-ammoniac. Almost all the gum-resins are medicinal substances, and little employed in the arts and manufactures.

GUM-TRAG'ACANTH, the gum of the *Astragalus Tragacantha*, a thorny shrub found in Crete, Asia, and Greece. It has the appearance of twisted ribands, is white or reddish, nearly opaque, and a little ductile; it swells considerably in water, partially dissolving, and forming a very thick mucilage.

GUN, a fire-arm, or weapon of offence, invented in the 14th century. The term includes everything that forcibly discharges a ball, shot, &c., through a cylindrical barrel, by means of gunpowder, except the pistol and mortar. The larger species of guns are called cannon, and the smaller muskets, carbines, fowling-pieces, &c. Cannon were used at the battle of Cressy in 1346, and perhaps three years earlier at the battle of Algesiras. But there is a piece of ordnance at Amberg in Germany, inscribed with the year 1303. Guns were originally made of iron bars united together, and strengthened with iron hoops; an example of which is still preserved in the Tower of London. They were at first fired with a match, or sparks produced by the revolution of a steel wheel, and were so heavy that the soldiers were provided with rests to support them. Muskets with rests were used so lately as the civil wars in the time of Charles I. About the middle of the last century the troops throughout Europe were armed with firelocks, which until lately were furnished with flints. Every gun is required by act of parliament to be tested before being sold. Cannon were originally very long in the bore, and large charges were used with them; but the experiments of Robins and others showed that neither is necessary. The best length has been found to be 17 calibres, but in the English service the regulation length is 14. In battery guns, whatever the total length of the gun, a certain length is necessary in front of the trunnions; for the embrasures of earth from which they are generally fired would be shattered if the muzzles did not project beyond them. For a similar reason navy guns must project to a certain distance beyond the side of the vessel. The art of constructing guns is in a state of transition, new forms of artillery being likely to supplant the old. Of these new forms the *Armstrong gun* is at present in the highest favour. This gun is strengthened by, or built up of, superimposed rings or hollow cylinders, each grasping those within. In America the *Dahlgren gun* (named from its inventor), has been much employed. It is constructed like an ordinary cannon except that it is made very thick at the breech, whence it tapers down sharply to less than the usual size.

GUN-METAL, a hard alloy composed of 90 per cent. of copper, nearly 10 per cent. of zinc, and a minute quantity of tin, employed for parts of apparatus where there is much friction.

GUN'NERY, the science of using artillery judiciously, and with the greatest effect. Besides an accurate acquaintance with the management of ordnance of all kinds, the charge and angle of elevation necessary for different distances, &c., the artillerist must be practically skilled in throwing up batteries and other field-works; he must understand mathematics (particularly the doctrine of curves, to calculate the path of the balls) and mechanics. [See PROJECTILES.]

GUN'NY BAGS, employed for bringing rice to this country from the east, are made from the inner bark of a tree called by botanists *Corchorus capsularis*, nat. ord *Tiliaceæ*.

GUN'POWDER, a compound of about 78 parts saltpetre, 12 charcoal, and 10 sulphur. The ingredients must be quite pure, separately reduced to powder, thoroughly mixed, moistened, and formed into a cake, which is afterwards broken up, granulated or corned, dried, and polished by attrition. The violence of the explosion of gunpowder is due to the sudden and abundant production of gases which are expanded by the intense heat. It is supposed that at the moment of explosion the heated gases occupy at least 2000 times the space of the powder. The gases produced are carbonic acid and nitrogen, along with sulphuret of potassium, which gives rise to the white smoke that follows the explosion. 28 grs of gunpowder, confined in a cylindrical space which it just filled, was found to exert a force of more than 400,000 lbs. Gunpowder was known in Europe in the 13th century, and to the Chinese long before.

GUN'TER'S CHAIN, in Mensuration, the chain commonly used in measuring or surveying land, so called from the inventor It is 66 feet in length, and is divided into 100 links of 7·92 inches each; consequently an acre of land is equal to 10 square chains And as there are 100,000 square links in an acre, the contents of a field made up in square links is changed into acres merely by moving the decimal point five places to the left.——GUNTER'S LINE, a logarithmic line, usually graduated upon scales, sectors, &c. The numbers are generally drawn on two separate rulers, sliding against each other, and it enables us to perform multiplication and division instrumentally, as a table of logarithms does arithmetically. It is very useful in rough calculations.——GUNTER'S QUADRANT, the simplest form of a quadrant. It is provided with two sight-holes, and a string with a bob of lead; and is used for roughly measuring vertical angles: also, for finding the hour of the day, the sun's azimuth, and solving other common problems of the sphere. The face of this quadrant is also provided with useful scales and tables.

GUN'TER'S SCALE, generally called by seamen *Gunter*, is a large plain scale having various lines of numbers engraved on it, by means of which questions in navigation are solved with a pair of compasses. The natural lines are on one side of the scale, and the corresponding logarithms on the other.

GUN'WALE, the uppermost wale of a ship, or that piece of timber which reaches on either side from the quarter deck to the forecastle, being the uppermost bend, which finishes the upper works of the hull The *bulwark* is above this.

GUR'NARD (*gournal: Fr.*), the name of several acanthopterygious fishes, belonging to the genus *Trigla*. The head has a peculiar aspect, being four-sided and encased in bone. Several species have been taken on our coasts.

GUS'TO (taste: *Ital.*). This word is used figuratively for *intellectual taste*.

GUT (*kutteln: Germ.*), the intestinal canal of an animal. It extends with many circumvolutions from the pylorus to the vent, is composed of three coats, and is attached to the body by a membrane called the mesentery. The thin and small portions are called by anatomists the *duodenum*, the *ilium*, and the *jejunum*: the large and thick, the *cæcum*, the *colon*, and the *rectum*. By means of this canal, the undigested and unabsorbed parts of food are conveyed from the stomach and discharged. *Silkworm Gut*, used by anglers, is obtained by placing the silkworm in vinegar after it has left off feeding and is preparing to spin its cocoon. After macerating about three weeks, the worm is broken across over the silk bag, which is then gently extended until it is of the proper thickness. When this is dried it forms the gut.

GUT'TA PER'CHA, a substance contained in the sap of a tree 60 or 70 feet high, belonging to the natural order *Sapotaceæ* (*Isonandra Gutta*), abounding in the island of Singapore and in the Malayan peninsula, especially in Borneo It appears to separate from the juice or sap of the tree in the same way as India-rubber, and its general properties with regard to solvents and to the products of destructive distillation resemble those of caoutchouc. The first sample of gutta percha was brought to England in 1843. Since that period the gum of this obscure plant has been manufactured by European ingenuity into an incredible variety of useful articles. In fact, it takes upon itself all shapes, in obedience to the skill of man; and its adaptability to all climates, its impenetrable and enduring qualities, will cause it to be employed in almost every department of arts and manufactures. When immersed for a few minutes in water above 150 Fahr., it becomes soft and plastic, so as to be capable of being moulded to any shape, which it retains on cooling. It resists water, damp, and all the causes which produce fermentation. It is not acted upon by caustic and concentrated alkaline solutions, nor those of the vegetable and mineral acids. Weak alcoholic liquors do not affect it: even brandy dissolves but a trace of it. Olive oil dissolves none of it while cold, and very little when hot. Sulphuric, muriatic, and nitric acids attack it when they are concentrated, particularly the last. About 20,000 cwts. of gutta percha are annually imported.

GUT'TA SERE'NA (the *drop serene* of Milton: *Lat.*), or AMAUROSIS, which see, a disease in the retina of the eye, which deprives the patient of his sight. The sensibility of the retina, or optic nerve, is either wholly or partially lost. Sometimes it effects only one half the eye; sometimes it is intermittent.

GUY (from *guide*), in Marine language, a large slack rope, extending from the head of the mainmast to that of the foremast, to sustain a tackle for loading or unloading. Also, a rope used to keep a heavy body steady while hoisting or lowering.

GYMNA'SIUM (*gumnasion*, from *gumnos*, naked: *Gr.*), in Grecian Antiquity, the name given by the Spartans to the public building where the young men, naked, exercised themselves in leaping, running, throwing the discus and spear, wrestling, &c. Gymnasia were afterwards very common in all parts of Greece; and were imitated, augmented and improved, at Rome. They were not single edifices, but a collection of buildings united; being so capacious as to hold many thousands of people at once, and having room enough for philosophers, rhetoricians, and the professors of all other sciences, to read their lectures, and for wrestlers, dancers, &c, to exercise at the same time without the least mutual disturbance or interruption. Two of those at Athens, the Lyceum and Academy, were respectively rendered famous by the lectures of Aristotle and Plato.

GYMNAS'TICS (*gumnastikos*, relating to bodily exercises: *Gr.*), the art of practising the several bodily exercises, as wrestling, running, fencing, dancing, &c. These were considered of the highest importance in Greece, but at Rome they were exercised only by mercenary athletes. Modern gymnastics are intended chiefly for the preservation and promotion of health.

GYMNOS'OPHISTS (*gumnosophistai*: fr. *gumnos*, naked; and *sophistēs*, a philosopher: *Gr*), a sect of Indian philosophers who went barefooted, and almost in a state of nudity, living in the woods and on mountains, and subsisting on the productions of the earth. They never drank wine; maintained a life of celibacy; and believed in the transmigration of the soul. There was a sect, of the same name, in Africa, who differed from the others in living as anchorites.

GYMNOSPER'MOUS (*gumnos*, naked; and *sperma*, seed: *Gr*), in Botany, having naked seeds, or seeds not enclosed in a capsule or other vessel Amongst the *Coniferæ* and *Cycadaceæ*, the seeds are fertilized by the direct application of the pollen to them, and hence these orders have been placed in an alliance called *Gymospermæ* or *Gymnogens*.

GYMNO'TUS (*gumnotus*, bare-backed: from *gumnos*, naked: and *nōtos*, the back: *Gr.*). [See ELECTRICAL EEL.]

GYNÆCE'UM (*gunaikeion*, belonging to women: *Gr.*, or *Gynæconites*), amongst the ancient Greeks the apartment of the women, a separate portion of the house, where they employed themselves in spinning, weaving, and needlework. The men's part of the house was termed *Adronitis* (*andros*, of a man: *Gr.*).

GYNÆCOC'RACY (*gunaikos*, of a woman; and *kratos*, power: *Gr.*), a state in which women are allowed to govern. The term is used in contradistinction from the *Salic law*, by which females are excluded from the throne in some European states.

GYNÆCON'OMI (*gunaikonomoi*: from *gunē*, a woman; and *oikonomos*, a manager: *Gr.*), certain magistrates amongst the Athenians, who had charge of the interests of the women, and punished such as forsook the line of propriety and modesty. A list of such as had been fined was put up by them upon a palm-tree in the *Ceramicus*. The *gynæconomi* were ten in number, and differed from the *gynæcocosmi*; for the former were inspectors of manners, the latter of dress.

GYNAN'DRIA (*gunē*, a female; and *anēr*, a male: *Gr.*), the 20th class of the Linnæan system of plants. Its characteristic is, having the stamens, style, and stigma, consolidated into a body called a column. It consists chiefly of plants termed *orchidaceous*.

GYP'SUM (*gupsos*: *Gr*.), a mineral known as *sulphate of lime*, *alabaster*, *selenite*, *satin spar*, *gyps*, and *plaster of Paris*. When it is carefully burned, it loses its water of composition, and forms the well-known *plaster of Paris*. The transparent varieties of gypsum are termed *selenite*; the massive *alabaster*; and the fibrous, *satin spar*. A species found in small pearly scales is termed *schaumkalk*. In the manufacture of stucco ornaments, plaster of Paris, mixed with water to the consistence of cream, is used, and during consolidation expands into the finest lines of the mould, so as to give a sharp and faithful impression.

GY'RFALCON (*gyr*, a vulture: *Ger.*; and *falcon*), the common name of the *Falco Islandicus*, the largest of the falcons breeding in these islands. It was formerly much prized by persons devoted to falconry, and large sums were paid for specimens procured in Iceland, which were thought superior to others.

GYRI'NUS (*gurinos*, from *guros*, round: *Gr.*), a genus of aquatic beetles, the type of which is the whirligig or water-beetle. They usually employ themselves in running round and round in company, on the surface of a piece of water. When disturbed they dart under water, carrying with them a small bubble of air.

GY'ROSCOPE (*guros*, round; and *scopeo*, I see: *Gr.*), an instrument invented by M. Foucault for proving the rotation of the earth about its axis. Its principle depends upon the powerful resistance which a rapidly revolving heavy body opposes to a change of position in its axis of rotation. A disc of metal, with a heavy circumference suspended in a particular way, is set in rapid rotation in a given plane. If the instrument be carefully constructed the motion may be kept up long enough to show phenomena which can only be explained by assuming the rotation of the earth.

H

H, the eighth letter and sixth consonant of the English alphabet. Until about the 5th century before Christ the letter H was used by the Greeks to signify the aspirate; it was afterwards their capital e long, the aspirate being indicated by (ʽ): but it was retained by the Latins, who, however, wrote several words with and without it indifferently: thus, *aruspex* and *haruspex*, *onustus* and *honustus*, &c.; and, in borrowing words from the Greek, they often changed the *h* into *s*: thus, *sex*, from *hex*, six; *serpo*, from *herpo*, I creep, &c. In English words, *h* is sometimes mute, as in *honour*, *honest*; also when united with *g*, as in *right*, *flight*, *brought*. In *which*, *what*, and some other words where it follows *w*, it is sounded before it, *hwich*, *hwat*, &c. H, among the Greeks, as a numeral, signified *eight*. As an abbreviation, among the Romans, it signified *homo*, *hæres*, *hora*, &c.; and for L.L. in H.S., a *sestertius*. This being *libra libra semis* (two pounds and a half, or, as they were termed two asses and a half), would be represented in full by L.L.S.; but it was shortened into H.S. This use of the letter *h* is universal among ancient Latin writers, when speaking of Roman money [see SESTERTIUS]. As a numeral, they used it for 200, and with a dash over it, for 200,000. With us it is an abbreviation for *Hanover*:—G.C.H. *Grand Cross of Hanover*. For *Hegiræ*:—A.H. *Anno Hegiræ* (the year of the Hegira.) For *his* or *her*:—H.M.S. *His or Her Majesty's Ship*. For *holy*:—H.R.E. *Holy Roman Empire*, &c.——In Music, H is the seventh degree in the diatonic scale, and the twelfth in the chromatic.

HA'BEAS COR'PUS (you are to have the body: *Lat.*), in Law, the title of a writ, of which there are several kinds:—*Habeas corpus ad respondendum*, you are to bring up the person to answer: *Lat.*), to remove a prisoner confined by the process of an inferior court, in order to charge him with a new action in a higher. *Habeas corpus ad faciendum, subjiciendum, et recipiendum* (you are to produce the body, to do, submit, and receive whatever the court shall direct), a writ directed to a person detaining another, and a great safeguard against unjust imprisonment or delay of trial. Blackstone considers it the grand Palladium of the liberty of the subject. The writ of habeas corpus is the glory of the British constitution: it not only protects the citizen from unlawful imprisonment at the suggestion of the civil officers of the government, but also against groundless arrests at the suit or instigation of individuals. The right, however, has been suspended by the legislature in times when it seemed desirable to clothe the executive with an extraordinary power, as the Romans were in the habit of choosing a dictator in emergencies in which the commonwealth was in danger.

HABEN'DUM (to have: *Lat.*), in Law, that clause in a deed of conveyance which sets forth the estate intended to be granted in the lands, &c. conveyed. It begins 'to have and to hold.'

HAB'ERGEON (*Fr.*). [See HAUBERK]

HAB'IT (*habitus: Lat.*), in Philosophy, an aptitude or disposition either of mind or body, acquired by a frequent repetition of the same act: thus, virtue is called a habit of the mind; strength, a habit of the body.——HABIT, in Medicine, denotes the settled constitution of the body; also a particular state formed by nature, or induced by extraneous circumstances.——HABIT, in Natural History, signifies the general form and appearance of an animal or plant.

HAB'ITAT (it inhabits: *Lat.*), in Botany, the nature of the places where a plant is found, on a mountain, in a marsh, by the sea-shore, and so on.

HAC'KLE (*hechel: Ger*), a tool with which flax and hemp are dressed. It consists of long iron teeth, regularly set in a piece of board; being, in fact, a large kind of card.

HAD'DOCK (*hadot: Fr.*), a malacopterygious fish, nearly allied to the cod; the *Gadus æglefinus* of ichthyologists. It has a long body, the upper part of a dusky brown colour, and the belly of a silvery hue It is found in vast shoals in the northern seas, on the coasts of Britain and Ireland, &c.; and is a most valuable article of food.

HA'DES (*a*, not; and *eido*, I see: *Gr.*), in Mythology, the abode of the dead

HA'DING, in Mining, the direction of a slip or fault. The deviation of a mineral vein from the vertical is called its *hade*.

HADJEE, amongst the Mahometans a pilgrim who has visited the prophet's tomb at Mecca.

HAD'LEY'S QUAD'RANT, an instrument founded on the laws of reflection, and which enables the mariner, however unsteady the ship may be, to take the altitude of the sun, &c. Though termed a quadrant because it can measure arcs of 90°, its arch is only the eighth part of a circle.

HÆMATI'TE (*aima*, blood: *Gr*), in an extremely rich and fine iron ore, the native oxide. It is very ponderous, and is either of a pale red, a deeper red, or a bluish colour; is usually of a very glossy surface, and, when broken, of a fine and regularly striated texture, the striæ converging towards the centre of the body, and the masses naturally breaking into fragments of a broad base and pointed end, appearing somewhat pyramidal.

HÆMAT'OCELE (*aima*, blood; and *kēlē*, a hernia: *Gr.*), in Medicine, a hernia from extravasation of blood.

HÆM'ORRHAGE (*aimorrhagia*: from *aima*, blood; and *rhēgnumi*, I break: *Gr.*), a flux of blood from any part of the body. It may arise from a full state of the vessels, or *plethora*, in which case it is termed *active hæmorrhage*; or from a debilitated state of the vessels or system generally, when it is termed *passive hæmorrhage*.

HÆM'ORRHOIDS (*aimorrhois*: from *aima*, blood; and *rheo*, I flow: *Gr.*), in Medicine, tumours of the hæmorrhoidal veins, or veins of the rectum, constituting the disease called *piles*, and very often accompanied with a flow of blood.

HAGIOG'RAPHY (*hagios*, holy; and *graphē*, a description: *Gr.*), the Holy Scripture. The term has been applied also to the histories or legends termed the lives of the saints. The Jews divide the books of the Scriptures into three parts:—the Law, which is contained in the first five books of the Old Testament; the Prophets, or Nevim, and the Cetuvim, or *writings*, by way of eminence The latter class, called by the Greeks *Hagiographai*, comprehends the books of Psalms, Proverbs, Job, Daniel, Ezra, Nehemiah, Ruth, Esther, Chronicles, Canticles, Lamentations, and Ecclesiastes.

HAIL (*hagel: Ger.*), a meteor which occurs chiefly in spring and summer, is often accompanied by thunder and lightning, and always by electrical phenomena. Hailstones generally consist of a porous mass like frozen snow, surrounded by layers of ice Their form is exceedingly varied, but is generally roundish: they are usually about a quarter of an inch in diameter; but they occasionally weigh nine or ten ounces They sometimes fall with great velocity, and not unfrequently do considerable mischief to the glass of windows, and even to the growing crops. Many explanations have been given of the formation of hail, it is most probably an aggregation of small particles of moisture frozen in the upper regions of the air, and increased during descent by freezing rain. Hail occasionally falls with such violence as to kill large numbers of animals. Deer, cattle, and ostriches have been killed in numbers by hail storms in South America.

HAIR (*haar: Ger.*), the characteristic covering of the mammiferous class of animals. Hairs originate in a follicle, formed in the substance of the true skin. They are allied in structure to the epidermis. At the base of each there is a bulbous enlargement; the interior of which consists of a soft substance, called pulp. The hair is increased by the continual supply of pulp in the follicle, and its conversion into the substance of hair as it issues through the neck of the follicle Hairs consist of a cortical material of a horny texture and a pith-like interior. In the human hair the cortical part is transversely striated. The hairs of the bat tribe bear rings of small spines, and hence are frequently mounted as microscopic objects. Bristles, fur, and wool, are all modifications of hair. Some kinds of hair, as the human, &c., are perennial and grow continuously; others are shed at particular seasons. Many kinds of animals have two species of hair, a fine and a coarse: it is one of the processes of the arts to remove the latter, and leave the former, as in seal skin. Hair consists chiefly of indurated albumen, and yields some gelatine when boiled with water.——HAIR, in Botany, the down or hair-like threads on the surface of plants.

HAIR'-PENCILS, in Painting, are composed of very fine hairs, obtained from the minever, the marten, the badger, the polecat, &c., which are mounted in a quill when they are small or of moderate size, but when larger than a quill in tin tubes. The most essential quality of a good pencil is to form a fine point, so that all the hairs may be united when they are moistened by drawing them through the lips

HAIR'S-BREADTH, a measure of length, equal to the forty-eighth part of an inch

HAL'BERD (*halebarde: Fr.*), an offensive weapon somewhat like a spear, formerly carried by a body of men called *halberdiers*, and more recently by the sergeants of foot and artillery.

HAL'CYON (*Lat.*; from *halkuōn*: *hals*, the sea; and *kuo*, I conceive: *Gr.*), or *Kingfisher*, the *alcedo ispida* of ornithologists, a British bird with beautiful plumage. It frequents the neighbourhood of streams, and subsists on small fish, water-beetles, and leeches. The name halcyon was given to this bird by the ancients, as the female was supposed to lay her eggs in nests, on rocks near the sea, during the calm weather, about the winter solstice. It was formerly a common notion (and this is often alluded to by our old poets) that a dead bird, suspended by a thread, would point its bill to the quarter whence the wind blew.——HALCYON DAYS, in Antiquity, seven days before, and as many after, the winter solstice; so called from the halcyon being supposed to select that period for incubation. The weather was then generally remarkable for calmness, and hence *halcyon days* was a term used to express days of 'peace and tranquillity.'

HALF'-BLOOD, in Law, relationship by the father's or mother's side only.

HALF'-MOON, in Fortification, an outwork composed of two faces, forming a salient angle, whose gorge is in the form of a crescent or half-moon.

HAL'IBUT (*heilbutte: Ger.*), the *Hippoglossus vulgaris* of ichthyologists, a flat fish allied to the turbot. Both eyes are on the right side of the head It grows to a great size, being the largest of the *Pleuronectidæ* or flat-fish family. It is sometimes seven feet in length, and occasionally weighs 400 lbs. It forms an article of food, but is coarse and dry.

HALIO'TIS (*halios*, marine; *ous*, the ear: *Gr.*), a genus of gasteropodous molluscs, with ear-shaped shells, perforated with a series of holes. One species of ear shell is the *Ormer* of the Channel Islands. Other species from warm seas have shells that are remarkable for the pearly iridescence of their inner surface.

HALLELU'IAH (praise ye the Lord: *Heb.*), a doxology derived from the Old Testament, and, from its harmonious softness, retained by us without translation.

HAL'LIARD (*haulyard*), a rope or tackle for hoisting or lowering a sail, signal, &c.

HALLUCIN'ATION (*hallucinatio*, a wandering of the mind: *Lat.*), in Medicine, *dysæsthesia*, erroneous imagination. *Hallucinations of the senses* arise from some defect in the organs of sense, or from some unusual circumstances attending the object; and they are sometimes symptomatic of general disease, as in fevers. *Maniacal hallucinations* arise from some imaginary or mistaken idea.

HA'LO (*Lat.*), in Natural Philosophy, a luminous ring or circle, sometimes white and sometimes coloured, appearing round the body of the sun, moon, or stars, when seen through a thin cloud or a misty atmosphere. It is of two kinds. The first is of small dimensions, and generally consists of three or more concentric rings, differently coloured, and presenting appearances similar to the phenomena produced with very thin plates of transparent substances. These are usually termed *coronæ* (crowns). The second kind, or *halos* properly so called, are very much larger. The lunar halo is a white luminous circle, sometimes having its inner edge tinged with red. But the solar halo exhibits colours like those of the rainbow, though not so vivid; their interior is red, their exterior a violet, which gradually blends with the sky; sometimes there is also another much larger and concentric halo, the colours of which are fainter. *Coronæ* are supposed to be formed by the *deflection* of light in passing small watery globules suspended in the atmosphere; and *halos* by the *refraction* of light in passing through small transparent and prismatic crystals of ice floating in the upper regions of the atmosphere.

HAL'OGENE (*hals*, the sea, and *gennao*, I produce: *Gr.*), in Chemistry, those substances which form compounds of a saline nature, by their union with metals; as *chlorine, iodine, &c.*

HAM'ADRYAD (*hamadruas*: from *hama*, together with; and *drus*, an oak: *Gr.*), in the Heathen Mythology, a *wood nymph*, supposed to live and die with the tree to which it was attached.

HAM'MOCK (*hamac: Fr.*), a bed used at sea. It contains the mattress, pillow, &c., and consists of a piece of hempen cloth, six feet long and three feet wide, at each end of which are fastened several small lines meeting in an iron ring, and forming *clews*. It is hoisted to its place by small ropes termed *lanyards*, between two battens or screws in the beams of the deck.

HAM'STER, the common name of rodent animals belonging to the genus *Cricetus*, and the family of rats. The *C. vulgaris* abounds in the sandy regions extending from the north of Germany to Siberia, burrows out apartments of great extent, and stores in them great quantities of grain. To effect this, nature has provided it with cheek pouches, which it fills in the cultivated grounds, and empties in its hole by pressing its two fore paws against them. They are torpid during the severity of winter. The pole-cat is their great enemy.

HAN'APER (*hanaperium*, a hamper: *Mod. Lat.*), a common-law office in the court of chancery, which has been abolished and its duties transferred elsewhere. Writs relating to the subject were anciently deposited there in hampers or wicker baskets: hence the name. Those relating to the crown were kept in the *petty* or *little bag*, whence the name of another office.

HAND (*Ger.*), in Anatomy, a member of the human body, which is composed of 27 bones, viz. the eight bones of the CARPUS or wrist, the five bones of the METACARPUS forming the palm, and the fourteen bones or **Phalanges** of the fingers. The characteristic feature of the hand as distinguished from the paw of a quadruped is, that the thumb is opposable to the other fingers. The hand of the quadrumana has also this characteristic.——**Hand**, in the manège, a measure of four inches, by which the height of a horse is computed. Also the parts of a horse, as the *fore hand*, for the head, neck, and fore quarters; the *hind hand*, which includes the rest. It also denotes the horseman's hand; as the *spur-hand*, which is his right hand; and the *bridle-hand*, which is his left hand.——**Hand**, in Heraldry, is termed either *dexter* (right) or *sinister* (left); and when borne in the escutcheon, is supposed to symbolize power, equity, fidelity, and friendship.

HAND'ICAP, in the language of the turf, a race in which the horses carry weights in proportion to their ages and previous performances.

HAND'LING, a technical expression amongst painters referring to the mechanical execution of a picture. The handling may be broad and free, as in Rembrandt's paintings, or delicate and laboured, as in Leonardo da Vinci's, or finical, as Carlo Dolce's, and so on.

HAND'PLANT, a Mexican shrub, the *Cheirostemon platanoides* of botanists, nat. ord. *Sterculiaceæ*. It has no corolla: the calyx resembles a bathing cap, and in the middle there is a column bearing five curved anthers surrounding a curved style. These cause the flower to have some resemblance to a hand with long claws. The Mexicans have some superstitious notions connected with the plant.

HAND'SPIKE, a strong wooden bar, used as a lever to move the windlass and capstan in heaving up the anchor, or raising any weight on board a ship.

HANSEAT'IC (*hanse*, an association: *Teut.*), pertaining to the Hanse towns or to their confederacy. The Hanse towns in Germany were certain commercial cities which associated for the protection of commerce as early as the 12th century. To this confederacy acceded certain commercial cities in Holland, England, France, Spain, and Italy, until they amounted, at one time, to eighty-five, and for centuries it commanded the respect and defied the power of kings. Its power, though still very formidable, began to decline from the middle of the 15th century. This, however, was not owing to any misconduct on the part of its leaders, but to the progress of that improvement which it had done so much to promote. The civilization which had been at first confined to the cities, gradually extended over the contiguous country, and feudal anarchy was everywhere superseded by a system of subordination and the progress of the arts. At present it only consists of the cities of Hamburg, Lubeck, and Bremen

HAR'BOUR (*herberg*: *Dut.*), a port, haven, or inlet of the sea, in which ships can moor, and be sheltered from the fury of winds and a heavy sea.

HARD-A-LEE, in seamen's language, an order to put the helm close to the lee side of the ship, to tack or keep her head to the wind.——**Hard-a-weather**, an order to put the helm close to the weather or windward side of the ship.——**Hard-a-port**, an order to put the helm close to the larboard side.——**Hard-a-starboard**, an order to put the helm close to the starboard side.

HARD'NESS (*heard*, firm: *Sax.*), one of the characters by which minerals are described and identified. The term, however, does not refer to the tenacity by which the parts are held together when struck by a hard substance, but to the power of scratching others, or the liability to be scratched. Thus, the diamond scratches all other minerals, but is scratched by none. It therefore is placed at the head of the scale of hardness, whilst talc, being so soft that it is scratched by almost every other mineral that has any tenacity at all, is placed at the bottom of the scale.

HARD'WARE, small instruments and utensils manufactured from metals: comprising iron, brass, steel, and copper articles of all descriptions. Birmingham and Sheffield are the principal seats of the British hardware manufacture; and from these places knives, razors, scissors, firearms, gilt and plated goods, &c., are supplied to an extent almost incredible. The aggregate value of the hardware manufacture of England and Scotland is estimated at 17,500,000*l.* a year; and it gives employment to 360,000 persons.

HARE (*hara*: *Sax.*), a well-known genus of rodent mammalia, containing the *Lepus timidus*, or common hare. It is a beast of chase, and is sometimes pursued by greyhounds in open ground, which is called *coursing*; and sometimes by harriers or hare-hounds, which is called *hare hunting*. It subsists on a great variety of vegetables, especially those which possess milky qualities; the bark of young trees and their tender shoots are likewise often taken by them for food. The hare produces generally three young ones at a time, and breeds at least three times in a year. Its fleetness is such as to give it the advantage over many of its numerous adversaries. Its quickness of hearing and extent of vision, by which last it receives the impression of objects on almost every side, are also important means of its protection.

HA'REBELL, or **HAIR-BELL**, a small herbaceous plant, with monopetalous blue flowers, the *Campanula rotundifolia* of botanists.

HA'RELIP, a fissure of the upper lip, by which it is divided into two parts, and thus resembles the lip of the hare. Sometimes there are two fissures. It is a great deformity, but, fortunately, is generally curable by certain surgical operations.

HA'REM (*Turk.*), the apartments in Turkish houses appropriated to the women. In that of the sultan, the women are waited on by female slaves and guarded by black eunuchs: the head of the latter is called *Kizlar-aga*. There are two kizlar-agas, one of the old, the other of the new palace, each of which has its harem. The one harem is occupied by the women of former sultans, and those who have incurred the displeasure of the reigning prince: the other by such as still enjoy his favour. The lady who first presents him with a male heir is styled the *sultana*, by way of eminence. She must then retire into the old palace; but if her son ascends the throne, she returns to the new palace, and has the title of *sultana valide*. She is the only woman who is allowed to appear without a veil: none of the others, even when sick, are permitted to lay aside the veil in the presence of any one except the sultan. The women of other Turks enjoy the society of their friends at the baths, or at each other's houses, appear in public accompanied by slaves and eunuchs, and are allowed a degree of liberty which increases as they descend in rank. But those of the sultan have none of these privileges. It is, of course, only the richer Moslems who can maintain harems, the poorer classes have generally but one wife.

HA'RE'S-EAR, a name given to some plants of the umbelliferous genus *Bupleurum*, and to the *Erysimum austriacum*, a cruciferous plant.

HAR'LEQUIN (*arlequin: Fr.*), the principal male character in a pantomime. He is clad in a parti-coloured dress, with a half mask, and is perpetually dancing, leaping, or performing tricks with his wonder-working wand. This character was first introduced into Italian comedy, where he united extravagant buffoonery with great corporeal agility.

HARMAT'TAN, the name given to a prevailing wind on the coast of Africa, which is of a peculiarly dry and parching character.

HARMON'ICA or **ARMON'ICA** (*harmonikos*, harmonical: *Gr.*), a musical instrument, in which the sound is produced from glass goblets, resembling finger-glasses, tuned by filling them more or less with water. It is played with the end of a finger damped, and the effect is produced in the same way as in the common experiment with a drinking glass and water. The less the quantity of water in one of these glasses, the lower the tone. It is difficult to bring out the tones instantaneously, but a touch of the finger will stop the vibration and prevent a confusion of sound. The tones are very sweet, but suited only to soft and plaintive airs

HARMON'ICAL PROPOR'TION, in Arithmetic, is that in which the first term is to the third as the difference of the first and second is to the difference of the second and third: thus, 2, 3, 6, are in harmonical proportion, because 2 : 6 : : 1 : 3. In four terms, the first is to the fourth as the difference of the first and second is to the difference of the third and fourth: that is, 9, 12, 16, 24, are in harmonical proportion, because 9 : 24 : : 3 : 8. To find an harmonical mean between two terms, divide double their product by their sum.

HARMON'ICS (next), that branch of music which considers the differences and proportions of sound, with respect to *acute* and *grave*.

HAR'MONY (*harmonia: Gr.*), in Music, the agreeable combination of several musical sounds heard at the same time. *Natural harmony* consists of the harmonic triad or common chord. *Artificial harmony* is a mixture of concords and discords. *Figured harmony* is that in which, for the purpose of melody, one or more of the parts of a composition move, during the continuance of a chord, through certain notes which do not form any of the constituent parts of that chord——**HARMONY OF THE SPHERES**, a favourite hypothesis of Pythagoras, and many other ancient philosophers, according to which celestial music, imperceptible to the ears of mortals, was supposed to be produced by the sweetly-tuned motions of the stars and planets.

HAR'MOTOME (*harmos*, a joint; and *tomē*, a cutting: *Gr.*), in Mineralogy, a curious substance, called also *Cross-stone*, on account of the cruciform figure of its crystals. It chiefly occurs in metalliferous veins: its prevailing colour is white; it is translucent or semi-transparent, and hard enough to scratch glass

HARP (*harfe*: *Ger.*), a musical stringed instrument, of a triangular figure It stands erect, and, when used, is placed at the feet of the performer, who produces its tones by the action of the thumb and fingers of both hands on the strings. Its origin is very variously described, but whatever it may have been, its invention is manifestly very ancient, for it appears to have been in use (under various forms) with the Egyptians, Hebrews, Greeks, and Romans. The Anglo-Saxons excelled in playing on the harp. The Irish, Scotch, and Welsh also made much use of this instrument; and with the Anglo-Normans it was equally popular. By the Welsh laws, a knowledge of the harp was one of the things required to characterize a freeman or gentleman: and none could pretend to this rank unless he had a harp and was able to play upon it. This instrument has been latterly much improved by pedals, &c. But the pianoforte, which is as it were a harp laid on its side, and played by intermediate mechanism instead of directly by the fingers, is a far more perfect and convenient instrument.

HAR'PIES (*harpuiai*, from *harpazo*, I snatch away: *Gr.*), in Mythology, three rapacious winged monsters, supposed to be the goddesses of storms. They were sisters, the daughters of Pontus (the sea), and Terra (the earth), and were called Aëllo, Ocypete, and Celæno. They had the faces of women, the bodies of vultures, and claws on their fingers and toes.

HARPOO'N (*harpon: Fr.*), an iron instrument, formed at one end like the head of an arrow, and having a rope at the other, for the purpose of spearing the whale. As soon as the boat has been rowed sufficiently near to the whale, the harpooner launches his instrument; and the fish, being wounded, immediately descends with amazing rapidity, carrying the harpoon along with it, and a considerable length of the line, which is purposely let out, to give it room to dive. Being soon exhausted with fatigue and loss of blood, it re-ascends, in order to breathe, but soon expires, and floats upon the surface of the water.——**HARPOON**

GUN, an instrument for discharging harpoons at whales more effectively than by hand.

HARP'SICHORD (*Fr.*), a musical instrument with strings of wire, played by means of keys. It may be considered as an early, but very imperfect form of the *pianoforte*. The sounds were produced by small pieces of quill, which, when forced past the strings, caused them to vibrate. Its jingling sound was far inferior to that of the pianoforte.

HAR'PY, or Imperial Eagle, the *Harpyia destructor* of ornithologists, a powerful bird of prey, which frequents the forests of Central America. It is three feet and a half long, and has a crest of feathers on its head. It belongs to the short-winged section of the eagle family.

HAR'RIER, a small hound, with an acute sense of smell, kept for hunting hares. Also, a name given to some birds of prey belonging to the Falcon family, and to the genus *Circus* of ornithologists.

HAR'ROW, in Agriculture, a rectangular frame with a number of spikes inserted in one side. This very useful instrument is employed to prepare ploughed land for the seed, and to mix the seed with the soil after it has been sown.

HARTS'HORN, SPIRITS OF, an impure solution of carbonate of ammonia, obtained by the destructive distillation of hart's-horn, bone, &c. An impure solid carbonate of ammonia, called *salt of hartshorn*, is formed at the same time. Water, holding ammonia in solution, was called by the older chemists, and is still called by the vulgar, *spirits of hartshorn*.

HARUS'PICE (*haruspex*: from *hara*, an intestine; and *specio*, I look at: *Lat.*), in Roman History, a person who pretended to foretell events by inspecting the entrails of beasts sacrificed, or watching the circumstances attending their slaughter, or their manner of burning, and the ascent of the smoke.

HAR'VEST-MOON, a term applied to the moon when, in the autumnal months, it rises, on successive nights, soon after sunset. In harvest, the moon is in Pisces and Aries; these signs then being opposite to the sun. And when her orbit is in the plane of the ecliptic, that is, when these signs correspond to her nodes, her time of rising will not differ more than an hour and forty minutes in seven days; while at other times, though she is in these signs, it may differ three hours and a half. As the nodes go backwards through the whole ecliptic in nearly nineteen years, the harvest-moons will, in that period, go through a whole course of most and least beneficial states, with respect to the farmers.

HA'SHISH (*Arab.*), a narcotic preparation of hemp, used by the Turks and other Eastern peoples to produce a species of intoxication.

HASTA'TI (*Lat.*, from *hasta*, a spear), among the Romans, soldiers armed with spears, who were always drawn up in the first line of battle. These were picked out in the flower of life. There were two other divisions called *Principes* and *Triarii*, to which were added, at the siege of Capua, B.C. 211, the *Velites* or *light troops*, then first formed into a corps.

HATCH'ETINE, in Mineralogy, a waxlike substance, found sometimes in nodules of ironstone, and named after Hatchett. It is usually considered a bitumen.

HATCH'ING (*hecken*, to hatch: *Ger.*). [See INCUBATION.]

HATCH'MENT, in Heraldry, an armorial escutcheon, which is usually placed over the door of a person of distinction, deceased, and points out the sex, conjugal connection, and dignity. These circumstances are denoted by the form and accompaniments of the field, and the *colour of the ground* of the hatchment.

HATCH'WAY, in ships, a large square or oblong opening in the deck, affording a passage into the hold, &c. There are the fore, main, and after hatchways.

HA'TTI-SHERIFF, in Turkish polity, an order which comes immediately from the Grand Signior, who subscribes it usually with these words: 'Let my order be executed according to its form and import.' These words are generally edged with gold, or otherwise ornamented; and an order given in this way is irrevocable.

HAU'BERK (*usbergo*: *Ital.*) or HAB'ERGEON, armour very common in the 12th century. It consisted of a jacket or tunic with wide sleeves, reaching a little below the elbow, and a hood, all in one piece, covered with chain or ringed mail. In France, it was the armour of a knight: and only persons of a certain property were allowed to wear it. Esquires might use a simple coat of mail, without hood and hose

HAU'TBOY or O'BOE (*haut*, high: and *bois*, wood: *Fr.*), a musical wind instrument, shaped somewhat like the flute, but spreading and widening at the bottom, and producing sound by a reed. Its ancient name was *wayght*, whence originated the word *wait*, by which the hautboy was known until the beginning of the present century.

HAUYNE, a mineral, so named in honour of the celebrated Abbé Hauy. It is blue, occurs in small granular or spherical masses, and is generally found in basalt or lava. It is composed of silica, alumina, and potash.

HAV'ERSACK (*havresac*: *Fr.*), a kind of bag of strong coarse linen, used to carry bread and provisions on a march.

HAVER'SIAN CANALS; these are longitudinal canals, which have been discovered by the microscope in bone, through which they transmit blood-vessels. The bone is arranged concentrically around these canals.

HAW'FINCH, the *Coccothraustes vulgaris* of ornithologists, a species of grosbeak, which feeds on haws and cherries. It breeds in this country, but is a very shy bird.

HAWK (*hafoc*: *Sax.*), the name of some birds of prey belonging to the falcon family. There are two species in this country, the sparrowhawk and the goshawk, both used formerly in falconry. They are very rapacious, feeding on birds and small animals; but the sparrowhawk is the boldest and most pertinacious of all in pursuit of its prey

HAWK'ERS, persons travelling from town to town with goods for sale: they are required to take out licenses.

HAWK'ING. [See Falconry.]

HAWK'WEED, the name of the species of *Hieracium*, a genus of *Compositæ*.

HAWSE, the part of the bows of a ship close to the cable. When the ship has two anchors down, and the cables diverge, the hawse is said to be clear; when they are crossed by the ship's turning half round, there is a *cross* in the hawse; another cross makes an *elbow;* and another, a *round turn;* and, in the latter two cases, the hawse is *foul.* Disengaging the cables is *clearing the hawse.*——**Hawse-hole**, a cylindrical hole in the bow of a ship, through which a cable passes.——**Hawser**, a rope, in size between a cable and a tow-line.

HAW'THORN or **WHITE THORN**, the *Cratægus oxyacantha* of botanists, nat ord *Rosaceæ*, the common shrub, which bears the red fruit called the *haw.*

HAY'WARD (*haie*, a hedge; and *garder*, to preserve. *Fr*), an officer anciently charged with the care of the cattle in a manor, so that they should not injure the hedges

HA'ZEL (*hæsel: A. Sax*), the *Corylus avellana* of botanists, a well-known shrub which has the male flowers in catkins, growing separately from the female flowers

HEAD, that part of the body of vertebrate animals which contains the brain and the organs of seeing, hearing, smelling, and tasting. [See Cranium]

HEAD'LAND, a point of land lying further out to sea than the rest.——**Headland**, in Husbandry, the upper part of land left for the turning of the plough——**Head-lines**, in a ship, those ropes of all sails which are next to the yards, and by which the sails are made fast to the yards——**Head-sails**, those which belong to the foremast and bowsprit.——**Head sea**, a great wave or billow of the sea coming right ahead of the ship as she is in her course——**Head-stall**, that part of a bridle that goes about the head; also, a kind of halter.——**Head-quarters**, the quarters or place of residence of the commander-in chief of an army.

HEAR'ING (*hören*, to hear: *Ger.*), one of the five senses, of which the ear is the organ. See Ear.——**Hearing Trumpet**, an instrument for concentrating sound and conveying it to the ear. It should be so constructed that the whole of the vibrations will be concentrated, by reflection, into a focus at the smaller end; but the precise form is not very important, as the chief advantage is derived from confining the sound by continual reflection, and preventing it from spreading laterally.

HEART (*herz: Ger.*), in Anatomy, a hollow muscular organ, the function of which is to maintain the circulation of the blood. The human heart is formed of a firm thick muscular tissue, composed of fibres interlacing with each other, and is supplied with nerves and vessels, which are termed *coronary.* Its coronary arteries branch off from the aorta, and the coronary veins return the blood in the right auricle. Its nerves are branches of the eighth and great intercostal pairs. It is divided in the middle by a strong partition, and on each side by two cavities, called *ventricles*, one the right or pulmonic, and the other the left or systemic. Attached to the base of the heart are two *auricles*, so called from their resemblance to an ear. In the right auricle there are four apertures: two of the *venæ cavæ*, one of the coronary vein, and one an opening into the right ventricle. There are five apertures in the left auricle: one into the left ventricle, and those of the four pulmonary veins. Each ventricle has two orifices: one from the auricle, and another into the artery. The ventricles are supplied with valves: those at the arterial opening being, from their form, called *semilunar*, those at the orifice of the right auricle, *tricuspid;* and those at the orifice of the left auricle, *mitral.* The valve at the termination of the *vena cava inferior*, just within the auricle, is called the *valve of Eustachius.* The blood is returned from the various parts of the body by the venæ cavæ into the right auricle, whence it is forced into the right ventricle, from this it passes, by the pulmonary artery, into the lungs; it returns from the lungs, by the pulmonary veins, into the left auricle; it passes from the left auricle into the left ventricle; and thence, by the aorta, through the general circulation The dilatation of the heart is called *diastole;* its contraction, *systole.* The alternate contraction and dilatation of the heart are entirely involuntary, and dependent on the nervous system. It has been calculated that the daily work of an ordinary human heart, in propelling the blood, is equal to the lifting 124 tons a foot high.

HEAT was formerly supposed to be a subtle form of matter It is now believed to be a peculiar motion of the particles of matter; and the laws of its communication are considered to be the same as those of the communication of motion. It has a definite mechanical value, and it may be converted into mechanical effect, whilst mechanical effect may be converted into heat. This is termed the dynamical theory of heat, which has only been experimentally established of late years The result of Dr. Joule's experiments is, that each Fahrenheit degree of temperature is equivalent to the lifting of 772 lbs one foot high, and these amounts of heat and power are capable of being reciprocally converted into one another. The unit of measurement is styled a foot-pound. The immediate consequence of heating a body is to increase its bulk, as if each molecule was endowed with a repulsive force, so that solids become fluids, and fluids, by a further increase of temperature, become gases The only exception to this law appears to be on the conversion of ice into water, the liquid in this case occupying less bulk than the solid. The principle of thermometers and pyrometers depends on the dilatation of bodies by heat. Bodies conduct heat on very different degrees; gold and silver for example being good conductors, and atmospheric air a bad conductor. It has also been found that in the same body its conductivity diminishes as its tem perature increases. The diffusion of heat amongst the particles of fluids and gases has been termed convection As it was found that different bodies required very different quantities of heat to raise them to the same temperature (water for example requiring twice as much heat to raise it to a given temperature as an equal weight of mercury), it was said that they had different *capacities* for heat, and the ratio of the capacity of any body to that of another, assumed as a standard, was termed the specific heat of that body The term *latent heat* was applied to that heat which was lost to the thermometer when a solid body was liquefied, or a liquid body converted into a gas. It was thought that this heat remained combined in some mysterious way with the molecules. But it is now considered that the heat which disappears under the circumstances referred to is exhausted in the work of tearing the molecules apart. Heat is also radiated, that is, it moves through space like light, in all directions. Bodies possess this power of radiation in different degrees; and it appears that the more highly polished the surface the less is the radiation. The sun is the great source of heat on our globe; but it is well known that friction and percussion also generate heat. It has been found by experiment that the quantity of heat produced by friction is always proportional to the quantity of work expended, and this applies both to solids and liquids. Chemical action, electrical action, and vital action, also produce heat. In these cases it probably arises from the clashing together of the particles of matter under the influence of chemical affinity

HEATH, the common name of plants belonging to the genus *Erica*, nat. ord. *Ericaceæ*, of which more than 250 species are known. Some of them are natives of Europe, but the greater part are found in South Africa, and are greatly admired on account of their lasting verdure, their light foliage, and the elegance of their flowers.

HEAV'Y SPAR, native sulphate of baryta, a mineral common in mining districts

HEBDOM'ADARY (*hebdomas*, a week: *Gr*), a member of a chapter or convent, whose duty it is to officiate in the choir, rehearse the anthems and prayers, and perform other services during the week, which, on extraordinary occasions, are performed by the superiors.

HEB'RAISM, an idiom or manner of speaking peculiar to the Hebrew language.

HE'BREW, the language spoken by the ancient Jews. The books of the Old Testament are the only remains of the ancient Hebrew, with an admixture, however, of Chaldaic, &c.——EPISTLE TO THE HEBREWS, a canonical book of the New Testament, attributed to St. Paul. It was addressed to the Christian Jews of Palestine.

HEC'ATOMB (*hekatombē*: from *hekaton*, a hundred; and *bous*, an ox: *Gr.*), amongst the Greeks, a sacrifice consisting of a hundred oxen offered upon some very extraordinary occasion.

HEC'TARE, a French superficial measure, containing 100 ares, and equal to 2·47 English statute acres.

HEC'TIC FE'VER (*hexis*, habit: *Gr.*), in Medicine, a continued fever, accompanied by debility, a small quick pulse, paleness, loss of appetite, excessive perspiration and emaciation. It is, in some degree, intermittent, but the sweating is not followed by the relief it brings in other febrile attacks. It very often accompanies consumption.

HEC'TOGRAMME (*hekaton*, a hundred: *Gr.*; and *gramme*), a French weight, containing 100 grammes or 1543·4 grains troy.

HEC'TOLITRE (*hekaton*, a hundred: *Gr.*; and *litre*), a French measure of capacity for liquids, containing 100 litres or 6102·8 cubic inches, that is, rather less than our *quart*.

HEC'TOMETRE (*hekaton*, a hundred: *Gr.*; and *mètre*), a French measure, equal to 100 mètres or 3937·0091 English inches.

HEDENBERG'ITE, in Mineralogy, a silicate of lime and iron, occurring in masses, composed of shining plates, which break into rhombic fragments. It was first analyzed by Hedenberg, in Sweden.

HED'ERA (ivy: *Lat*), in Botany, a genus of shrubby climbing plants, nat ord *Araliaceæ*, comprising the different kinds of ivy.

HED'GEHOG, the *Erinaceus Europæus*, a small harmless nocturnal animal which feeds on worms, insects, &c. It belongs to the family of moles, and is remarkable for the power of rolling itself into a globe, protected externally by its own prickles, when in danger. It is often kept in houses for the purpose of destroying cockroaches. Its popular name 'urchin' is probably a corruption of the Latin word 'erinaceus.'

HÉGI'RA (the flight: *Arab.*), the epoch of the flight of Mahomet from Mecca, July 16, A D 622, whence eastern nations date their year of 354 days.

HEIGHTS, MEASUREMENT OF. [See HYPSOMETRY.]

HEIR-AT-LAW (*hæres*: *Lat.*), the person to whom the real estate of an intestate descends. According to the law of England, if there are several children, the eldest son will take the real estate on the death of his father intestate. If there are no sons, but several daughters, the property will be divided amongst them equally. [See DESCENT.]——HEIR-APPARENT and HEIR-PRESUMPTIVE, terms applied to the possible successor to a crown or a dignity. The heir-apparent can only be deprived of the succession by his own death; the heir-presumptive may lose his right to succeed by a nearer heir coming into existence. Thus, the eldest son of a king of Great Britain is the heir-apparent to the crown; the next brother of an unmarried king is the heir-presumptive, whose right would be displaced if the king married and had a child

HEIR'LOOM, any personal chattel, such as a picture or a piece of plate, which, under a will or settlement, is directed to pass along with an estate. Heirlooms are only protected in the hands of tenants for life. They belong absolutely to the first person who has a vested estate of inherit ance, on whose death intestate they go to his executor.

HELI'ACAL (*hēliakos*, relating to the sun; from *hēlios*, the sun: *Gr.*), in Ancient Astronomy, an epithet applied to the rising or setting of the stars, or, more strictly speaking, to their emersion out of and immersion into the rays and superior splendour of the sun. A star rises heliacally when, after it has been in conjunction with the sun, and on that account invisible, it gets at such a distance from that luminary as to be seen in the morning before its rising. [See COSMICAL.]

HELIAN'THUS (*hēlios*, the sun; and *anthos*, a flower: *Gr.*), in Botany, a genus of plants, nat. ord. *Compositæ;* containing the Jerusalem artichoke and the garden sunflowers.

HELIOCEN'TRIC (*hēlios*, the sun; and *kentron*, a centre: *Gr.*). In Astronomy, the *heliocentric longitude* of a planet is the angle at the sun's centre, formed by the projection of its radius vector on the ecliptic, and a straight line drawn from the centre of the sun to the first point of Aries. The *heliocentric latitude* of a planet is the inclination of a line drawn between the centre of the sun and the centre of a planet to the plane of the ecliptic.——*Heliocentric place* of a planet, the place of the ecliptic in which the planet would appear to a spectator placed at the centre of the sun. [See GEOCENTRIC.]

HELIOG'RAPHY (*hēlios*, the sun; and *graphē*, a picture: *Gr.*), a method of giving permanency to images produced by the chemical effects of light. [See PHOTOGRAPHY.]

HELIOM'ETER (*hēlios*, the sun; and *metron*, a measure: *Gr.*), an instrument for measuring the diameter of the heavenly bodies.

HE'LIOSCOPE (*hēlios*, the sun; and *skopeo*, I examine: *Gr.*), in Optics, a sort of telescope, peculiarly fitted for viewing the sun without pain or injury to the eyes.

HE'LIOSTAT (*hēlios*, the sun; and *statos*, standing: *Gr.*), an instrument employed in surveying for reflecting a sunbeam from one spot to another.

HE'LIOTROPE (*hēlios*, the sun; and *tropē*, a turning round: *Gr.*), in Mineralogy, a sub-species of rhomboidal quartz, of a deep green colour. It is usually variegated with blood-red or yellowish dots, and is more or less translucent.——Also, the name of some sweet-scented shrubs, belonging to the genus *Heliotropium*, nat. ord. *Boraginaceæ.*

HELISPHER'ICAL (*helix*, a spiral; and *sphaira*, a sphere: *Gr.*), spiral. The *helispherical line* is the rhomb line in navigation; so called because on the globe it winds round the pole spirally, coming nearer and nearer to it, but never terminating in it.

HE'LIX (a spiral: *Gr.*), in Anatomy, the whole circuit of the auricle, or external border of the ear.——In Architecture, a spiral line, or something that winds; as, a winding staircase, or a small volute under the flowers of the Corinthian capital.——In Zoology, a very large genus of gasteropod molluscs, bearing shells. [See SNAIL.]

HEL'LEBORE (*helleboros: Gr.*), the *Helleborus niger*, or Christmas rose, an exotic plant, belonging to the nat. ord. *Melanthaceæ*, the medical properties of which depend on a peculiar alkaloid called veratrin. A minute quantity applied to the nose excites violent sneezing. The ancients esteemed it as a powerful remedy in maniacal cases; at present it is exhibited principally as an alterative; and it is recommended in dropsies and some cutaneous diseases. There is also the white hellebore, a poisonous plant, of the genus *Veratrum.*

HEL'LENIC, a division of the Indo-European family of languages, embracing ancient and modern Greek.

HEL'LENISM (*Hellēnes*, the Greeks: *Gr.*), a phrase peculiar to the Greek tongue.

HELLENIS'TIC (same *deriv.*), a name given to that dialect of the Greeks used by Jewish writers. Its peculiarity consisted in the introduction of foreign words, but little disguised, and of exotic metaphors and idioms; but they used the ordinary Greek inflections in great number.

HELM (*Ger.*), an instrument suspended along the hind part of a ship's stern-post, where it turns upon hinges to the right or left, serving to direct the course of a vessel, as the tail of a fish guides its body. The helm is usually composed of three parts, the rudder, the tiller, and the wheel; except in small vessels, in which the wheel is unnecessary. There are several phrases in nautical language relating to the helm: as, *up the helm*, put the tiller to the *weather* side; *down the helm*, put it to the *lee* side, *helm amidships*, or *right the helm*, put it even with the middle of the ship; *port the helm*, put it to the *left* side; *starboard the helm*, put it to the *right* side.

HEL'MET or **HELM** (*helmt* or *helm: Ger.*), defensive armour for the head, which was also called a *headpiece* and a *casque*. An *open* helmet left the face unguarded, but sometimes had bars from the forehead to the chin. A *closed* helmet covered the head, face, and neck, having slits for seeing objects, and perforations to admit air; its *visor* (*viser*, to take aim: *Fr.*), lifted up by means of pivots over the ears. A *beaver* (*buveur*, a drinker: *Fr.*), covered the mouth and chin, and either lifted up by revolving on the same pivots as the visor, or let down by other pivots near the jaws; it enabled the wearer to eat and drink with his helmet on. The helmets of the Greeks and Romans were open. The modern cavalry generally wear helmets.——The helmet is used in Heraldry, by way of crest over the shield or coat of arms, and expresses the different degrees of nobility by the different manner in which it is borne.

HELMINTHOL'OGY (*helmins*, a worm; and *logos*, a discourse: *Gr.*), the natural history of worms. [See ENTOZOA.]

HE'LOTS (*Heilōtes: Gr.*), certain slaves in Sparta, who, it is said, were originally inhabitants of the town of Helos, but were carried off and reduced to slavery by the Heraclidæ, about 1000 B.C. They differed from other Greek slaves in not belonging individually to separate masters; but being the property of the state, which alone had the disposal of their lives and freedom. Other accounts of their origin have been given.

HELVET'IC, an epithet designating what pertains to the *Helvetii*, the ancient inhabitants of Switzerland, or to the modern states and inhabitants of the Alpine regions; as, the *Helvetic* confederacy, &c

HEM'ACHATE or HÆM'ACHATE (*haima*, blood; and *achatēs*, agate *Gr*), in Mineralogy, a species of agate, of a blood colour.

HEM'ATINE or HÆM'ATINE (*haima*, blood: *Gr.*), in Chemistry, the colouring principle of logwood it is of a pale red, and a bitterish taste.

HEM'ATITE [See HÆMATITE.]

HEMERALO'PIA (*hemera*, the day; and *opsis*, vision: *Gr.*), in Medicine, nocturnal blindness; a disease which consists in inability to see in the evening, though the sight is perfect enough in the day-time. At sunset, objects appear to persons afflicted with this complaint as if covered with an ash coloured veil, that gradually changes into a dense cloud, which appears to intervene between the eyes and surrounding objects. When brought into a room faintly lighted by a candle, where others can see tolerably well, they can scarcely discern any object; and by moonlight their sight is still worse

HEMEROCAL'LIS (*hēmera*, a day; and *kallos*, beautiful: *Gr.*), in Botany, a genus of bulbous-rooted plants, nat ord. *Liliaceæ*, including the day lily of our gardens

HEM'I, a Greek word used in the composition of several terms borrowed from that language. It signifies *half*, being the same as *semi* and *demi*: thus, *hemiplegia* is a paralysis of one *half* of the body; *hemistich*, *half* a verse; *hemicycle*, a *semi*-circle.

HEMICRA'NIA (*hēmikrania* from *hēmi*, half; and *kranion*, the skull. *Gr.*), in Medicine, a species of headache, which affects only one half or side of the head.

HEMIOP'SIA (*hēmi*, half; and *ōps*, the eye: *Gr.*), in Medicine, a defect of vision, in which the person sees half, but not the whole of an object

HEMIPLE'GIA (*hēmiplēxia* · from *hēmi*, half; and *plēgē*, a stroke. *Gr.*), in Medicine, a paralytic affection of one side of the body.

HEMIP'TERA (*hēmi*, half; and *pteron*, a wing *Gr.*), in Entomology, an order of sucking insects; characterized by having a horny beak and four wings, of which the uppermost are thick at the base, with thinner extremities that lie flat and cross each other on the top of the back, or are of uniform thickness throughout, and slope at the sides like a roof. The young undergo an incomplete metamorphosis, the larvæ having the same form as the adult except as to the wings. The *bed-bug* and *water-boatman* (*Notonecta*) are examples of this order The species are numerous, and often beautifully coloured; but the odour is, in many, very disagreeable.

HEM'ISPHERE (*hēmisphairion*: from *hēmi*, half; and *sphaira*, a sphere: *Gr.*), in Astronomy, one half of the sphere. The equator divides the sphere into two parts, called the *northern* and the *southern hemispheres*. The horizon also divides the sphere into two parts, called the *upper* and *lower hemispheres*. The term hemisphere is also used for a map or projection of half the terrestrial globe, or half the celestial sphere, on a plane; and is then often called *planisphere*

HEMISPHEROI'DAL (same *deriv.*), in Geometry, an appellation given to whatever approaches to the figure of a hemisphere, but is not exactly one.

HEM'ISTICH (*hēmistichion*: from *hēmi*, half; and *stichos*, a verse: *Gr.*), in Poetry, half a verse, or a verse not completed. In reading common English verse, a short pause is required at the end of each hemistich

HEM'LOCK, the name of plants belonging to the umbelliferous genus *Conium*. *C. maculatum*, the greater hemlock, is poisonous; the alkaloid *Conia* employed in medicine is extracted from it. In Canada, the *Abies canadensis*, a coniferous tree, which attains the height of eighty feet with a diameter of three feet, is called *Hemlock*. It is an elegant tree with drooping branches. The bark is much used in tanning

HEMP (*hanf*: *Ger.*), the fibres of the inner bark of the *Cannabis sativa*. It is prepared for spinning in the same way as flax, and is made into strands or yarn for ropes The plant is supposed to be a native of India, but has long been naturalized in Europe, in many parts of which it is grown extensively. Only the coarser kinds of hemp are employed in making cordage; the finer being used for cloth, which, though incapable of receiving the delicacy of linen, is incomparably stronger, equally susceptible of bleaching, and possessed of the property of improving in colour by wear. The English hemp is much superior in strength to that which grows in any other country. Next to this is the Russian, from which sacking is usually made. A large quantity of Russian sheeting, coarser at the price than any other foreign cloth, is imported into England on account of its strength.

HEN'BANE, the name of plants belonging to the genus *Hyoscyamus*, nat. ord *Solanaceæ*. The *H. niger* is a wild British plant. The roots, leaves, and seeds are poisonous; but, from its narcotic qualities, it is occasionally serviceable in medicine. Its active principle, *hyoscyamine*, like belladonna, has the property of remarkably dilating the pupil, which causes so many rays to enter that vision becomes painful and imperfect.

HENDEC'AGON (*hendeka*, eleven; and *gōnia*, an angle: *Gr.*), in Fortification, a place defended by eleven bastions.——In Geometry, a figure of eleven sides and angles.

HENDECASYL'LABLE (*hendeka*, eleven; and *sullabē*, a syllable: *Gr.*), in poetical composition, a verse of eleven syllables Among the ancients it was particularly used by Catullus, and was well adapted fo elegant trifles.

HEN'NA, a dye obtained in Egypt from a plant, the *Lawsonia inermis*, nat. ord. *Lythraceæ*. The women stain their fingers and feet an orange colour with it. It is also used for dyeing skins and textile fabrics.

HEPAT'IC (*hēpatikos*, belonging to the liver: *Gr.*), in Medicine, an epithet for whatever belongs to the liver.——HEPATIC ARTERY, the artery which nourishes the substance of the liver.——HEPATIC DUCT, the trunk of the biliary pores. It runs from the sinus of the liver towards the duodenum, and is joined by the cystic duct.

HEPAT'IC AIR (same *deriv.*), the sulphuretted hydrogen or sulphide of hydrogen of modern chemistry.

HEP'ATITE (*hēpatitēs*, belonging to the liver: *Gr.*), a name given to the fœtid sulphide of barium. It sometimes occurs in globular masses, and is either compact or of a foliated structure. By friction or the application of heat, it exhales a fœtid odour like that of sulphide of hydrogen.

HEPATI'TIS (same *deriv.*), in Medicine, inflammation of the liver, of which there are two kinds, the *acute* and *chronic*. Both require attentive medical treatment. In warm climates, the liver is more likely to be affected with inflammation than perhaps any other part of the body, from the additional work thrown upon it. *Hepatic* respiration is intended as an auxiliary to *pulmonic*; but when any portion of the body is subjected to unusual exertion, its size is increased: hence the arm of the blacksmith is larger than if his employment were of a less energetic character. From its position, the liver cannot be augmented in size without inconvenience.

HEP'TACHORD (*hepta*, seven; and *chordē*, a string: *Gr.*), in ancient Poetry, verses accompanied by music played on seven chords producing different notes. The word was applied to the lyre when it had seven strings.

HEP'TAGON (*hepta*, seven; and *gōnia*, an angle: *Gr.*), in Geometry, a figure of seven sides and angles. The area of a regular heptagon is equal to the square of one of its sides multiplied by 3·6339124.——In Fortification, a place that has seven bastions for its defence.

HEPTAG'ONAL NUM'BERS (same *deriv.*), in Arithmetic, a kind of polygonal numbers, in which the difference of the terms of the corresponding arithmetical progression is 5. Thus:

Arithmeticals, 1, 6, 11, 16, 21, &c.
Heptagonals, 1, 7, 18, 34, 55, &c.

Each term of the latter is found by adding the corresponding arithmetical term to its preceding term. One of the properties of these numbers is, that if they are multiplied by 40, and 9 is added to the product, the sum is a square number.

HEPTAN'DRIA (*hepta*, seven; and *anēr*, a male: *Gr.*), the seventh class of the Linnæan system of plants, containing those which have seven stamens.

HEP'TARCHY (*hepta*, seven; and *archo*, I govern: *Gr.*), a government exercised by seven persons: or a nation divided into seven governments.——SAXON HEPTARCHY, the seven kingdoms existing in England between the fifth and ninth centuries. These kingdoms were severally named, 1. Kent; 2. Sussex; 3. Wessex; 4. Essex; 5. Northumberland; 6. East-Anglia; and 7. Mercia. The *heptarchy* was formed by degrees; but it may be said to have commenced in 449, when Hengist arrived on the island. In 827 Egbert was enabled, by a combination of circumstances, to assume the title of King of England; but, in reality, three of the kingdoms, Northumberland, East Anglia, and Mercia, were still governed by their own kings, though those kings were his vassals and tributaries. The kingdoms he actually governed were Kent, Sussex, Wessex, and Essex.

HERACLI'DÆ (the descendants of Hercules, in *Gr. Hēraclēs*). *The return of the Heraclidæ into Peloponnesus* is said to have taken place in the year of the world 2682, a hundred years after they were expelled, and eighty after the destruction of Troy.

HER'ALD (*héraut*: *Fr.*), the title of an officer, whose duty was, in former times, to declare war, to challenge in battle and combat, to proclaim peace, and to bear messages in war; but is, at present, to conduct royal processions, the creations of nobility, and the ceremonies of knighthood; to publish declarations of war, not to the enemy, but at home, to proclaim peace; to record and blazon armorial bearings; and to rectify abuses in arms, under the authority of the earl-marshal, by whom he is created. The heralds were formed into a college by Richard III. The three chief are called kings-at-arms; the principal of these is *Garter*; the next is *Clarencieux*, and the third *Norroy*; the last two are called provincial kings. Besides these there are six heralds, viz. York, Lancaster, Somerset, Richmond, Chester, and Windsor. Below these are four pursuivants, viz. Bluemantle, Rouge Dragon, Rougecroix, and Portcullis. Heralds, amongst the ancient Greeks and Romans, were held in great estimation, and looked upon as sacred. Those of Greece carried in their hands a rod of laurel, round which two serpents, without crests, were twisted as emblems of peace.

HER'ALDRY (same *deriv.*), the body of rules relating to armorial bearings, teaching how to blazon or describe them in proper terms, and how to marshal or dispose the different arms in an escutcheon or shield. The introduction of armorial bearings, in place of the images and statues of the Romans (the right to which was known among them by the term *jus imaginum*), is to be ascribed to the northern tribes who overran Europe on the decline and fall of the empire. Although at first strictly military, and intended to afford a means of recognizing the knight who, cased in complete armour, was unseen, yet, by being transmitted to his posterity, they became badges of civil rank and honour; and, in course of time, other circumstances gave rise to bearings which were not purely military. Thus, on the establishment of the feudal system, the tenants of the king, or the great lords, represented on their shields the services they owed to their superiors, by way of an acknowledgment of their fidelity, whence originated roses, cinquefoils, spur-rowels, bows and arrows, hunting-horns, ships, &c. When, inspired with religious enthusiasm, the martial youth of almost all Europe left their homes, about the end of the 11th century, to conquer the Holy Land, the use of coats of arms became more general and necessary. In order to distinguish nations, armies, and families, the princes and commanders chose their symbols, sometimes in commemoration of the exploits and events of the campaign, or of the dignity of the commander, and sometimes from the cause in which they were engaged. This probably introduced, or at least made more common, the figure of the cross, which is borne in a diversity of forms. In like manner, when tournaments were invented, they are supposed to have given rise to the fesse, pale, bend, and other ordinaries, which represented the fillets or lists of different kinds which were worn by the combatants and those who attended. And it was from the practice of a herald's describing and recording the names, arms, and proofs of nobility, of the knights at tournaments, that the science took its name. In heraldic science, arms are said to be of *pretension* or *dominion*. That is, *national*, or of *community*, as those of episcopal sees, cities, &c.; of *concession*, that is, augmentation of honour, being granted by sovereigns; of *alliance*, being derived from the union of families. And of *assumption*, being adopted according to the caprice of individuals. In times of chivalry, arms were chiefly displayed on the shield or escutcheon, and on the pennon or banner; also on sword-hilts, and on the mantle or surcoat—which gave rise to the term *coat of arms*. The East seems to have contributed most of the singular devices of heraldry. The Normans and French assiduously cultivated heraldry, and reduced it to a system. In the reign of Henry III. of England, the vocabulary of heraldry was nearly such as it is at present. [For its chief terms see their proper places.]

HERB (*herba: Lat.*), a plant with a soft or succulent not woody stalk or stem.

HER'BAL (same *deriv.*), a book giving an account of the names, nature, and uses of plants, their classes, genera, and species.

HERBA'RIUM (*herba*, an herb: *Lat.*) or HORTUS SICCUS (a dry garden: *Lat.*), a collection of specimens of plants carefully dried and preserved. The plants should be placed between sheets of porous paper as soon as possible after being gathered, and subjected to pressure. The paper should be repeatedly changed until the plants are quite dry. They should then be mounted on sheets of stout paper, either by means of a strong solution of gum, or of slips of gummed paper. If well prepared, an herbarium is exceedingly useful to the botanist. The name of the genus and species of plant should be written down, the place where it was found, the nature of the soil, and the season of the year at which it was procured. The specimens may be collected into orders and classes, and titled and preserved in a portfolio or cabinet.

HER'BORIZE (same *deriv.*), a botanical term, signifying to search for plants in their native places with a view to their examination.

HER'CULES, an old constellation in the northern hemisphere.

HEREDIT'AMENTS (*hæreditas*, an inheritance: *Lat.*), in Law, lands, tenements, and whatever a person may have to himself and his heirs, by way of inheritance; and which, if not otherwise bequeathed, descend to the heir, and not to the executor. *Corporeal* hereditaments are such as affect the senses. *Incorporeal* hereditaments are descendible rights upon or over corporeal hereditaments, as a right of pasture, advowsons, &c.

HER'ESY (*hairesis*, a choice: *Gr.*), an error in some fundamental doctrine of religion, or a private opinion different from that of the orthodox church. Roman Catholics hold all errors to be voluntary, which are known deviations from the judgment of the Roman Catholic church. A diversity of opinion has always existed on certain points, and always will exist. How unreasonable that, on speculative matters, men should be hated and persecuted for holding those opinions which, after much careful examination, they feel convinced are true, by those who, perhaps, scarcely understand the nature of what they would so tyrannically force upon others, and who have, in many cases, never troubled themselves about the foundations (if any) upon which it rests. Nothing can be more absurd than to demand what is not, even if we would, in our power to grant—an assent to a doctrine as true which our mind tells us is false. The adoption of any particular form of religion should be due to a conviction of its truth, ascertained by careful inquiry. If a religion be divine, the more it is examined the more satisfactory it will appear.

HER'IOT, in Law, the fine paid to the lord of the manor by copyholders on the death of the tenant. It is, usually, the best beast of which the tenant dies possessed.

HER'ISSON (a hedgehog: *Fr.*), in Fortification, a beam or bar armed with iron spikes pointing outwards, and turning on a pivot; used to block up a passage.

HERMAPH'RODITE (*Hermaphroditos*, from the mythological fable of *Hermes* and *Aphrodite*, that is, Mercury and Venus), in Zoology, a term used to designate the union of the two sexes in the same individual, as in many of the lower animals.——In Botany, a flower that contains both anthers and pistils.— In Zoology, hermaphroditism is the exception; in Botany, it is the rule.

HERMENEU'TICS (*hermeneutikos*, skilled in interpreting: *Gr.*), the art of finding the meaning of an author's words and phrases, and of explaining it to others. The word is seldom used except in reference to theological subjects.

HERMET'ICAL SEAL'ING (*hermétique*, hermetical: *Fr.*), among Chemists, formerly signified the method of closing vessels, &c., with the materials of which they are made; thus, glass with glass, and metal with metal. The barometer tube is *hermeti-*

cally sealed at one end, by melting the glass, and causing it to run together, so as completely to close the aperture. The phrase is now employed to signify such a closing of a vessel as prevents access of air to the interior

HER'MIT (*erēmitēs*, from *erēmos*, a desert: *Gr.*), a person who passes his time in total seclusion from the world The term is usually applied to one who lives in solitude for the purpose of religious contemplation and devotion. In the early ages of Christianity hermits were very numerous; and they still abound amongst Mahommedans and Buddhists

HER'MIT CRABS, marine crustaceans belonging to the family *Paguridæ* The thorax is covered with a hard crust, but the abdomen has only a soft skin, and these animals therefore protect themselves by taking up their abode in the cast-off univalve shells of molluscs, which are quitted for others as they grow larger. These they drag about with them when they are in search of food. From the red colour of some species they are frequently called soldier crabs.

HER'NIA (*Lat.;* from *hernos*, a sprout: *Gr*), in Surgery, a *rupture:* a tumour formed by the displacement of part of the intestines or omentum, which protrudes by a natural or accidental opening from the cavity in which it is contained. When the parts cannot be reduced, or returned into the abdominal cavity, the hernia is said to be *strangulated;* in that case, the passage through the intestines is interrupted, and, unless the gut can be replaced by an operation, death will soon ensue As soon as any person perceives that he is affected with a hernia, he should have recourse to medical advice, for the disease is then in the state most favourable for treatment. When the hernia is reduced, it must be subjected to a constant compression, which is effected by means of a truss.

HE'RO, in Pagan Mythology, an illustrious mortal, supposed to partake of immortality, and after his death to be placed among the gods There is no trace of hero-worship in Homer: it seems to have begun after his time; and those who fell at Marathon were the last to whom such honours were paid.——HERO, in a poem or romance, the principal personage, or the one who has the principal share in the actions related; as, Achilles in the Iliad, Ulysses in the Odyssey, &c ——HEROIC AGE, that age or period of the world in which the heroes or demigods are supposed to have lived. The heroic coincides with the fabulous age.——HEROIC VERSE, hexameter verse, so called because it is used by poets in their heroic poems.

HER'ON (*Fr.*), a name given to wading birds of the genus *Ardea*. They are allied to the crane and stork, but are distinguished by the middle claw on each foot being serrated. The best known species with us is the *Ardea cinerea*, an inhabitant of heronries which were formerly more numerous than at present, when falconry has gone out of fashion. Herons are very expert fishers, and take prey either by wading after it where the water is shallow, or by diving from the air when the object of their pursuit appears near the surface. They digest an enormous quantity of food in a short time.

HER'PES (*Gr.;* from *herpo*, I creep on) in Medicine, a term applied to several cutaneous eruptions, from their tendency to spread or creep from one part of the skin to another. One species is called *tetters;* another, *shingles;* and another, the *ringworm*, from its spreading in concentric circles They are generally seen in small distinct clustres, accompanied with itching, and terminating in scurfy scales. This disease takes various names, according to its form or the part affected. These eruptions differ from *erysipelas* by an absence of tumefaction, and by the natural appearance of the skin between the crops of eruption; and they are distinguished from other similar eruptions by the vesicular form of the cuticular elevations at their first appearance by their regular progress, and limited duration.

HERPETOL'OGY (*herpeton*, a reptile; and *logos*, a discourse: *Gr.*), that part of Natural History which treats of reptiles; a division of the sub-kingdom Vertebrata. This class of animals is distinguished by having the heart so constructed as to transmit only a *part* of the blood to the lungs, the remainder being sent back through the body unpurified: the animal heat and muscular activity are therefore lower with the *Reptilia* than the *Mammalia*. They are naked, that is to say without hair or feathers, being clothed only with scales or hard bony plates. Reptiles are, with few exceptions, *oviparous*, and do not incubate. They are destitute of the teats which are characteristic of mammals. Excluding the amphibia (frogs, toads, &c), which are now formed into a separate class, reptiles are divided into five orders:—1. *Sauria*, LIZARDS. 2 *Ophidia*, SNAKES 3. *Chelonia*, TURTLES and TORTOISES. 4. *Emydosauri*, CROCODILES and ALLIGATORS 5. *Amphisbœnia*. Fossil remains of some very large or curious forms of reptiles have been found. [See ICHTHYOSAURUS, PTERODACTYLE.]

HER'RING (*hering*, from *heer*, an army: *Ger.*, on account of their vast numbers), the *Clupea Harengus*, a malacopterygious fish. A grand shoal of many millions, divided into columns of five or six miles in length, and about four in breadth, appears at the Shetland Isles in June, where they branch off in all directions. Their progress is marked by the number of birds which follow them to prey upon them. Those which arrive at the British coasts are to be found in the greatest number off Yarmouth, the mart for herrings. Their migration is not from one latitude into another, but from a deeper to a shallower part of the ocean, where the ova may be deposited, and receive the proper amount of heat, light, and oxygen. [See FISHERIES]

HERSE or HERSILL'ON (*herse*, a harrow: *Fr.*), in Fortification, a portcullis armed with spikes, to block up a gateway or impede the march of an enemy.

HES'PERUS or VES'PER, in Astronomy,

the evening star; an appellation given to the planet Venus when it sets after the sun.

HET'EROCLITE (*heteroklitos*: from *heteros*, otherwise; and *klino*, I inflect: *Gr.*), in Grammar, a word which is irregular or anomalous, either in declension or conjugation, or which deviates from the forms of inflection usual with words of a like kind.

HET'ERODOX (*heterodoxos*: from *heteros*, different; and *doxa*, opinion: *Gr.*), the opposite of *orthodox*; a milder term than *heretical*, but of similar import.

HETEROG'AMOUS (*heteros*, different: and *gamos*, marriage: *Gr.*), in Botany a term applied to the flowers of the *compositæ*, when some of the florets of a capitulum are both staminiferous and pistilliferous, whilst others are only pistilliferous, or have neither stamens nor pistils.

HETEROG'ENEOUS (*heteros*, another; *genos*, kind: *Gr.*), that which is composed of unlike parts, opposed to *homogeneous*.

HETEROPHYL'LOUS (*heteros*, different; and *phullon*, a leaf: *Gr.*), in Botany, producing leaves of several forms.

HEX'AGON (*hex*, six; and *gōnia*, an angle: *Gr.*), in Geometry, a figure of six sides and angles. Its area is the square of one of the equal sides multiplied by 2·598076.

HEXAGYN'IA (*hex*, six; and *gunē*, a female: *Gr.*), in Botany, an order of plants in the Linnæan system, comprehending those with six pistils in the flower.

HEXAHE'DRON (*hex*, six; and *hedra*, a base: *Gr.*), in Geometry, one of the five regular solids; the cube. The other four are, the tetrahedron or pyramid, the octahedron, the dodecahedron, and the icosahedron.

HEXAM'ETER (*hexametros*: from *hex*, six; and *metron*, a measure: *Gr.*), in ancient poetry, a verse consisting of six feet, the first four of which may be either dactyls or spondees, the fifth must regularly be a dactyl, and the sixth always a spondee. The poems of Homer and Virgil are in this verse.

HEXAN'DRIA (*hex*, six: and *anēr*, a male: *Gr.*), in Botany, one of the Linnæan classes, comprehending those plants which have six stamens in each flower.

HEX'ASTYLE (*hexastulos*: from *hex*, six; and *stulos*, a column: *Gr.*), in Architecture, a building with six columns in front.

HIA'TUS (*Lat.*), an unpleasant opening of the mouth, when vowels end and begin words; also any deficiency in a manuscript which destroys the connection.

HI'BERNACLE (*hibernaculum*, winter quarters: *Lat.*), Linnæus's name for a bulb or a bud, in which the embryo of a future plant is enclosed by a scaly covering, and protected from injuries during winter.

HIBERNA'TION. [See DORMANT.]

HIBIS'CUS, a genus of plants, nat. ord. *Malvaceæ*, containing many species that are cultivated on account of their handsome flowers. The mutable rose (*H. rosa-sinensis*) and the Syrian hibiscus (*H. syriacus*) are examples.

HICK'ORY, the name of some North American trees, belonging to the nat. ord. *Juglandaceæ*, and therefore allied to the walnut. The common or shell bark hickory (*Carya alba*) and the smooth bark hickory (*C. glabra*) are tall and slender forest trees, having an average height of more than 100 feet. The wood is heavy and much used where strength is required. It is much prized for heating purposes, and it contains a considerable quantity of potash. The kernel of the nut of *C. alba* is eaten, but that of the other species is very bitter. The Pekkan nut, another North American tree, is *Carya olivæformis*.

HIDAL'GO (son of something: *Span.*), a term in Spain for a person of gentle birth. *Fidalgo* is the equivalent term in Portugal.

HIDE, a word formerly used in land-measure, for such a space as might be ploughed with one plough; or as much as would maintain a family.

HI'DEBOUND, in Farriery, a term for a disease in horses and cattle in which the skin cleaves to the side.——Also a term in Botany; a tree being said to be *hidebound*, when the bark is so close or firm as to impede the growth.

HI'ERARCHY (*hierarchia*: from *hiereus*, a priest, and *archo*, I govern: *Gr.*), a term applied sometimes to the supposed polity, or social constitution, among angels. Also ecclesiastical government, or the subordination of rank among the different orders of the clergy.

HIEROGLYPH'ICS (*hierogluphikos*: from *hieros*, sacred; and *glupho*, I engrave: *Gr.*), the expression of ideas by representations of visible objects; a word specially applied to the sculptured writings of the ancient Egyptians. These were wholly undecipherable for many ages, but Dr. Young discovered the track, and Champollion pursued it with perseverance and ingenuity. They are supposed to have consisted of three different characters:—1. The *hieroglyphics*, properly so called, which were representations of the objects themselves, either entire or abridged; and were divided into the *figurative proper*, *figurative conventional*, and *figurative abridged*. 2. Characters representing ideas by visible objects used as symbols, thus, a tumult, by a man throwing arrows, &c. Sometimes the connection between the type and antitype is obvious; in others it cannot be traced. These characters have been called *symbolical*: the Greeks termed them hieroglyphics. 3. Characters representing sounds, and termed *phonetic*. It is supposed they were likenesses of animals or objects whose names began with the letters or sounds; writers were not confined to the use of one representative for each letter. Besides hieroglyphics, the Egyptians used *hieratic* and *demotic* characters, which were conversions of the hieroglyphics into a current hand, the latter nearly alphabetical. The Mexicans, when the Spaniards invaded their country, used hieroglyphic or picture writing, but they had no alphabet.

HIEROGRAM'MATISTS (*hierogrammateus*: from *hieros*, sacred; and *grammateus*, a scribe: *Gr.*), in Antiquity, priests amongst the Egyptians who presided over learning and religion. Their duty was to take care of the hieroglyphics, and expound religious mysteries and opinions. They were also skilled in divination, and were honoured with many exemptions from civil duties and taxes.

HIERONI'CES (*hieronikēs*: from *hieros*, sacred; and *nikē*, victory: *Gr.*), in Antiquity, a conqueror at the Olympic, Pythian, Isthmian, and Nemæan games.

HIEROPHAN'TES (*hierophantēs*: from *hieros*, sacred; and *phaino*, I show: *Gr.*), the priest who initiated candidates at the Eleusinian mysteries. He was required to be a citizen of Athens; and held the office, which was of considerable importance, for life.

HI'GHNESS, a title of honour given first to bishops, then to princes. The kings of England, before James I., were not addressed with the title of 'majesty,' but that of highness only. At present the children of crowned heads are generally styled *royal highness*, a title first assumed by the Duke of Orleans, brother to Louis XIII. Those of the emperors of Austria and Russia are styled *imperial highness*. All other princes are addressed as *serene highness*.

HIGH-PRIEST, the head of the Jewish priesthood. Moses conferred this dignity upon his brother Aaron, in whose family it descended without interruption. After the subjugation of the Jews by the Seleucidæ, the Ptolemies, and the Romans, it was often arbitrarily conferred by their foreign masters. The importance of the high-priest's office is indicated by the splendour and costliness of his garment, which was among the most beautiful works of ancient art.

HI'LUM (a trifle: *Lat.*), in Botany, the part by which the ovule is united to the cord that attaches it to the placenta. In many ripe seeds the hilum is marked by a scar.

HINDOO'S, the Aryan inhabitants of the East Indies; a people distinguished for their humanity, gentleness, industry, and knowledge of the polite arts, at a time when most of their Asiatic neighbours were yet only in the first stages of civilization, when the Greeks were in obscurity, and the nations of Europe were in a state of barbarism. In earlier times, before they were oppressed by a foreign yoke, they had reached a high degree of civilization; and their country has been considered as the cradle of the arts and sciences. [See BRAHMINISM and CASTE.]

HIPPOCEN'TAUR (*hippokentauros*: from *hippos*, a horse; and *kentauros*, a centaur: *Gr.*), in ancient fable, a monster, half man and half horse. The *hippocentaur* differed from the *centaur* in this, that the latter rode on an ox, and the former on a horse, as the name imports.

HIP'POCRAS, a medicinal drink, composed of wine with an infusion of spices and other ingredients; used as a cordial.

HIPPOC'RATES' SLEEVE, in old Pharmacy, a conical bag, made of a square piece of flannel, and used for straining syrups and decoctions.

HIP'PODROME (*hippodromos*: from *hippos*, a horse; and *dromos*, a course: *Gr.*), in Antiquity, a course for chariot and horse races. The most celebrated was that at Olympia, finished by Constantine, and one which still fills with astonishment the traveller who visits the Turkish capital.

HIP'POGRIFF (*hippogriffe*: *Fr.*), a fabulous monster, compounded of a horse and a griffin. In Ariosto's 'Orlando Furioso,' the Knight Ruggiero is sent on a hippogriff to the moon.

HIPPOPOT'AMUS or **RIVER HORSE** (*hippopotamos*: from *hippos*, a horse, and *potamos*, a river: *Gr.*), a gigantic pachydermatous quadruped, equal to the rhinoceros in strength, and inferior only to the elephant in size, being from 12 to 20 feet long. It is supposed to be the *Behemoth* of Job. The head is very large, the legs are short and thick, and the short tusks are harder and whiter than those of the elephant. Its hide is so thick that it is bullet proof. It lives chiefly in water, and walks at the bottom, raising its head occasionally for respiration. It feeds on grain and vegetables, and, unless attacked or ill-treated, is perfectly harmless. There is only one living species, and that frequents the rivers of Africa. It is sometimes seen in salt water. The fossil remains of several extinct species have been found.

HIPPU'RIS (*hippouris*: from *hippos*, a horse; and *oura*, a tail: *Gr.*), in Botany, a genus of plants, nat. ord. *Haloragaceæ*. They grow in damp places, have very simple flowers, consisting only of a calyx with one stamen and one pistil, and are known as *mare's tails*. They must not be confounded with the horse tails, which are cryptogamic plants.

HIPS (*heopa*: *Sax.*), in Botany, the ripe fruit of the *dog-rose*, which is often made into a sweetmeat.

HIRU'DO (*Lat.*), the *Leech*, a genus of red-blooded worms, of aquatic habits, provided with a sucker at both ends of the body. The medicinal leech (*Hirudo medicalis*) has the oral aperture transverse, triradiate, and surrounded with three cartilaginous jaws, each armed with two rows of very fine teeth. This apparatus enables it to penetrate the skin, and insures a ready flow of blood, without causing a dangerous wound. The extent of the leech trade may be understood from the fact that four of the principal dealers in London annually import 7,200,000.

HIRUN'DO (a swallow: *Lat.*), in Ornithology, a genus of fissirostral or wide-gaping passerine birds, of which there are three species in Britain, the chimney swallow (*H. rustica*), the martin (*H. urbica*), and the sand martin (*H. riparia*). Africa seems the chief resort of the British swallow during winter. Some have supposed that they do not migrate, but pass the winter under water in a torpid state. But no warm-blooded animal can hybernate under water.——The nests of the *Hirundo esculenta* are reckoned a most exquisite delicacy among the Chinese, who make them into soups and use them in their most delicate dishes. They consist of a gelatinous substance, secreted by the bird to form the abode of its young. These nests have the form of a saucer, and the width of a tumbler. Those taken before the bird has laid its eggs are the most valuable: these are of a red colour, and nearly transparent, closely resembling isinglass, only more brittle. The best kind is sold in China at the rate of 9*s.* an ounce. They are dissolved in water, and made into a tasteless soup. The collection of the nests is said to be attended with difficulty and danger, as the birds construct them in caverns in sea cliffs.

HISTOL'OGY (*histos*, a web; *logos*, a discourse: *Gr.*), the study of the formation and growth of animal and vegetable tissues. It is prosecuted by the aid of the microscope.

HISTOR'ICAL PAINT'ING, that department of the art which 'treats of events, actions, and characters (says Mrs. Jameson) of high and general importance. It may be sacred or profane. It is termed sacred when the subjects are taken from the Holy Scriptures, or the legendary lives of saints; profane, when the subjects are borrowed from classical or modern history, or from the fables of ancient mythology.'

HISTORIOG'RAPHER (*historia*, history; and *grapho*, I write: *Gr.*), a professed writer of history.

HISTORY (*historia*, from *historeo*, I inquire: *Gr.*), a word which seems to have been first used by Herodotus. In strictness it is applied only to the civil history of man; though, when qualified, it is used to indicate other branches of investigation: thus *natural history*, &c. As to the class of events which it relates, civil history has been divided into ecclesiastical, political, and literary; as to extent, into universal and particular. The whole body of history has been classed under five heads:—1. That of the Jews. 2. That of empires and states illustrated by classical and Jewish writers, viz. Assyria, Persia, Egypt, Phœnicia, and Carthage. 3. Classical history, being that of the Greeks and Romans. 4. That of nations possessing annals of their own, viz. China, India, Modern Persia, Arabia, and the Mohammedan conquests. 5. Modern European history, including the colonies and conquests of Europeans. An historian should have the rare quality of being free from every prejudice, whether of country or of religion. The student of history should have the same, to profit by it as much as he may. [See TRADITION.]

HISTRION'IC ART (*histrionicus*, from *histrio*, an actor, and chiefly a pantomimist: *Lat.*), the art which teaches how to bear a part in dramatic representations.

HITCH, among seamen, a sort of knot or noose for fastening a rope to anything. Hitches are distinguished by the names of a *half-hitch*, a *clove-hitch*, a *rolling-hitch*, &c., according to the nature of the knot.

HOAR'-FROST (*har*, white: *Sax.*), the white particles of ice formed by the congelation of dew.

HOAR'HOUND, the name of several plants of different genera. The common hoarhound is the *Marrubium vulgare*, nat. ord. *Labiatæ*. It has a bitter taste, and is used as an attenuant.

HOCK'DAY or **HOKE'DAY**, a day of feasting and mirth, formerly observed in England the second Tuesday after Easter, to commemorate the destruction of the Danes in the time of Ethelred II., A.D. 1002.

HOG (*hwch*: *Wel.*), in Zoology, a well known and valuable quadruped, belonging to the genus *Sus*, which forms a link between the cloven-footed, the whole-footed, and the digitated quadrupeds. The domesticated varieties of the hog are exceedingly numerous. The generic characters are, four or six incisors in the upper jaw, converging; six in the lower jaw, projecting; two canines in the upper, and two in the lower jaw, very long; fourteen molars in each jaw; the snout prominent, truncate, and containing a peculiar bone; feet cloven. In their taste, hogs manifest a strange degree of caprice; for whilst they are singularly delicate in their choice of herbs, they will devour with voracity the most nauseous and putrid carrion.——The wild boar, from which all of our domestic varieties are derived, is found in most parts of Europe and Asia, and is by no means so filthy or stupid an animal as the tame hog. His snout is longer, his ears shorter; he roots up the ground in a different manner, ploughing it up in furrows; his tusks are larger, being, in some instances, ten inches long; they are bent circularly, and are exceedingly sharp at the points. Hunting this animal has always been a favourite amusement. When he is roused, he goes slowly and uniformly forward, frequently stopping and facing his pursuers, and inflicting severe or even mortal wounds.

HOGS'HEAD, a measure of capacity, containing 52½ imperial gallons. It is equal to half a pipe.

HOLD (*healdan*: *Sax.*), in ships, the whole interior or cavity of a vessel, which contains the ballast, water, coals, wood, provisions, and cargo. It is divided into the *after-hold*, the *fore-hold*, and the *main-hold*, by bulkheads.

HO'LINESS (*heilig*, holy: *Ger.*), a title given to the pope, who is styled 'your holiness,' or 'most holy father:' in Latin, *sanctissime* or *beatissime pater*.

HOL'LY (*holeyn*: *Sax.*), the name of some evergreen trees belonging to the genus *Ilex*, nat. ord. *Aquifoliaceæ*. The common holly (*Ilex aquifolium*) is well known for its polished prickly leaves and red fruit. It grows to a height of from 20 to 30 feet. The wood is very hard and is employed by inlayers and turners.——KNEE-HOLLY, a plant, the butcher's broom, of the genus *Ruscus*.——SEA-HOLLY, a plant, of the genus *Eryngium*.

HOL'LYHOCK, the *Althea rosea* of botanists, nat. ord. *Malvaceæ*. It is much cultivated in English gardens, but it is a native of the east.

HOL'OCAUST (*holokauston*: from *holos*, the whole; and *kaio*, I burn: *Gr.*), a burnt offering, or sacrifice wholly consumed by fire; of this kind was the daily sacrifice in the Jewish church. It was intended as an acknowledgment that the person offering, and all that belonged to him, were a proof of the divine bounty. The pagan nations, who also offered holocausts, probably considered them in the same light.

HOL'OGRAPH (*holographos*: from *holos*, the whole; and *grapho*, I write: *Gr.*), a writing wholly by the hand of the person whose instrument it is.

HO'LY ALLI'ANCE. A religious feeling had long prevailed among the nations of the Continent that their preceding sufferings, arising from the horrors of war and invasion, were the direct consequences of the French revolution, which they looked upon as a punishment inflicted upon the world for its impiety. After the fall of Napoleon, this feeling still remained strong in their minds, and they were induced to believe that religion might be made the basis of international politics. Participating in this spirit, and desirous of becoming the pacificator of Europe, the emperor Alexander of Russia applied to the emperor of Austria and the king of Prussia to join him in establishing an alliance for the promotion of this glorious object. To his request these monarchs readily acceded. The document which Alexander had drawn up, and sent to them in his own handwriting, was signed by the emperor of Austria and the king of Prussia. It was stipulated that the three sovereigns should invite others to become members of the Holy Alliance; and, in the sequel, all the European sovereigns, except the pope, joined it. Since the secession of England and France it can scarcely be said to exist.

HO'LY-ROOD DAY, a festival observed by Roman Catholics on the 14th of September, in memory of the exaltation of the Cross.

HO'LY THURS'DAY, in the Roman Catholic church, the Thursday before Easter Sunday.

HO'LY-WATER, in the Roman Catholic and Greek churches, water which has been consecrated by prayers and other ceremonies, and is used for sprinkling the faithful and things required for the church. It is contained in a particular kind of vases, at the doors of churches, and also within them at certain places; and from them the worshippers sprinkle themselves before prayer. The ancient Greeks and Romans used *lustral* water, when entering their temples; and employed it on other occasions also, to sprinkle and purify the people.

HO'LY WEEK, the week before Easter Sunday.

HOM'AGE (*hommage: Fr.*), in Law, the oath of submission and loyalty, which the inferior or tenant, under the feudal system, used to take to his lord when first admitted to his possessions or land.

HOM'ICIDE (*homicidium*: from *homo*, a human being; and *cædo*, I kill: *Lat.*), in Law, the killing of one human being by another. It is of three kinds, *justifiable*, *excusable*, and *felonious*; *justifiable*, when it proceeds from unavoidable necessity, without an intention to kill, and without negligence; *excusable*, when it happens from misadventure, or in self-defence; *felonious*, when it proceeds from malice, or is done in the prosecution of some unlawful act or in a sudden passion. Homicide committed with premeditated malice is *murder;* without it, *manslaughter*. Suicide, or self-murder, is also felonious homicide. [See FELO-DE-SE.] The lines of distinction between felonious and excusable or justifiable homicide, and between manslaughter and murder, are, in many cases, difficult to define with precision. But, in general, the accused has the advantage of any uncertainty or obscurity that may hang over his case, since the presumptions of law are usually in his favour.

HOM'ILY (*homilia*, an assembly: *Gr.*), a sermon or discourse upon some point of religion, delivered in a plain manner, so as to be easily understood by the common people. In the primitive church, homily meant rather a conference or conversation by way of question and answer, which made part of the office of a bishop till the fifth century, when the learned priests were allowed to preach, catechize, &c., in the same manner as the bishops used to do. There are still extant several fine homilies, composed by the ancient fathers.——HOMILETIC THEOLOGY, a branch of practical theology, which teaches the manner in which ministers of the gospel should adapt their discourses to the capacities of their hearers; and points out the best methods of instructing, both by their doctrines and examples.

HOMŒOP'ATHY (*homoios*, like; and *pathos*, feeling: *Gr.*), a medical practice which had its commencement in the beginning of the present century. The fundamental principles are that every medicine has a specific power of inducing a certain diseased state of the system; and that if such medicine be given to a patient suffering under the disease, it disappears. Medicines, therefore, are administered to an extent just sufficient to induce an action superior to that of the disease; but still in *infinitesimal* quantities, the millionth of a grain being often too much. Medical men do not generally admit any reality in this system; they attribute the cures which it seems to effect to regimen and habits beneficial to the patient, and which they themselves in many cases would prefer to the administering of medicines.

HOMOGE'NEOUS (*homoios*, like; and *genos*, kind: *Gr.*), a term given to substances when they consist throughout of an aggregation of similar particles, in opposition to *heterogeneous*.

HOMOL'OGY. Those parts of organized beings which correspond in structure and origin, but not in office, are termed homologous; those parts which are only alike in function are said to be analogous. Thus, the wings of birds and the wings of insects are analogous, not homologous; the air-bladder of fishes is homologous with, but not analogous to, the lungs of the higher vertebrates; whilst the wings of birds and the pectoral fins of fishes are both homologous and analogous, that is, they have not only the same office, but the same structural origin. 'No group of organic beings,' says Darwin, 'can be well understood until their homologies are made out; that is, until the general pattern, or, as it is often called, the ideal type, of the several members of the group is intelligible. No one member may now exist exhibiting the full pattern; but this does not make the subject less important to the naturalist, probably makes it more important for the full understanding of the group. The homologies of any being, or group of beings, can be most surely made out by tracing their embryological development when that is possible; or by the discovery of organs in a rudimentary condition; or by tracing through a long series of beings a close gradation from one part to another, until the two parts or organs employed for widely different functions, and most unlike each other, can be joined by a succession of short links. No instance is known of a close gradation between two organs, unless they be homologically one and the same organ. The importance of the science of homology rests on its giving us the key-note of the possible amount of difference in plan within any group; it allows us to class under proper heads the most diversified organs; it shows us gradations which would otherwise have been overlooked, and thus aids us in our classification; it explains many monstrosities; it leads to the detection of obscure and hidden parts, or mere vestiges of parts, and shows us the meaning of rudiments.'

HOM'OPHONE SIGNS (*homos*, like; *phōne*, a sound: *Gr.*); in Philology, when different signs stand for the same sound they are said to be homophone.

HOMO'PTERA (*homos*, like; *pteron*, a wing: *Gr.*), a sub-order of insects with four membraneous wings, of which the first pair are larger, and do not lap over each other when the insects are in a state of repose. The coccus, the cuckoo-spit insect, the LANTHORN FLY, the CICADA, and plant-lice (APHIDES), belong to this order. The metamorphosis of the homoptera is incomplete. This sub-order is a division of the order *Rhyncota* or *Hemiptera*.

HON'EY (*honig*: *Ger.*), a sweet viscid liquor, secreted in the nectaries of flowers, collected by the working bees, and deposited in the cells of the combs. *Virgin honey* is that which is obtained from the hive of bees that have never swarmed; also, that which runs out of the comb of itself. Honey appears to be merely gathered by the bees; for it consists only of vegetable products, such as the sugars of grape, gum and manna, along with mucilage extractive matter, a little wax, and acid Narbonne honey owes its peculiar excellence to the flowers on which the bees feed. Trebizond honey is remarkable for its intoxicating properties. Many instances of poisonous honey have been recorded. Honey contains a crystallizable sugar, and an uncrystallizable in the liquid state.

HON'EYCOMB, a waxen substance, of a firm, close, texture, formed by bees into hexagonal cells, in which they deposit their honey and eggs. These cells are arranged in two layers, placed end to end, the openings of the different layers being in opposite directions. The comb is placed vertically, the cells being therefore horizontal; and it is strengthened, where possible, by additional supports, the parts being fastened to one another and to the sides of the hive. The interval between the different cakes of comb is sufficient readily to allow the passage of two bees; and passages which are pierced here and there afford a communication between all parts of the hive. The sides of the cells are all much thinner than the finest paper; and yet they are so strengthened by their arrangement that they are able to resist all the motions of the bee within them. In fact, the construction of the cells is such as to allow the greatest possible number in a given space, with the least possible expenditure of material.

HON'EY-DEW, a sort of saccharine substance ejected on plants by certain *aphides*.

HON'EY LO'CUST, a leguminous deciduous tree belonging to the genus *Gleditschia*, so named after Gleditsch, a Berlin botanist. Most of the species are natives of China or North America and have acacia-like leaves and large branching thorns.

HON'EY STONE or MELLITE, a mineral found in lignite deposits. It has a yellowish or reddish colour and crystallizes in octahedrons with a square base. It is a combination of alumina and mellitic acid, a peculiar compound of carbon, oxygen, and water.

HON'EYSUCKLE or WOODBINE, well-known plants with fragrant flowers, species of the genus *Lonicera* in the nat. ord. *Caprifoliaceæ*.

HONG, the Chinese name for a European factory. The *Hong merchants*, of whom there are about a dozen, reside at Canton, and are responsible for the conduct of the Europeans with whom they deal

HON'OUR (*honor*: *Lat.*), in Law, a superior seigniory, to which other lordships and manors owe suit and service, and which, itself, holds of the king only.——HONOURS OF WAR, honourable terms granted to a vanquished enemy, when he is permitted to march out of a town with drums beating, colours flying, &c., and all the insignia of military pomp.——LAWS OF HONOUR, among persons of fashion, signify certain rules by which their social intercourse is regulated, and which are founded on a regard to reputation. These laws require a punctilious attention to decorum in external deportment, but often lead to the most flagrant violations of moral duty.——COURT OF HONOUR, an ancient court of civil and criminal jurisdiction, having power to redress injuries of honour, and to hold pleas respecting matters of arms and deeds of war.

HON'OURABLE (*honorabilis*: *Lat.*), a title, given by courtesy, to the younger sons of earls, and to all the children of viscounts and barons; to persons enjoying certain places of trust and honour; collectively, to the House of Commons, to the East India Company, and to each of the Inns of Court. Also, an epithet of respect or distinction given by members of the House of Commons, when speaking of other members, as, 'the honourable gentleman.'

HOOP'ING-COUGH (*houpper*, to shout: *Fr.*; if spelled *whooping*-cough, *wopgan*, to shout: *Goth.* The French word is derived from this), a disease marked by a convulsive strangulating cough, in which the patient whoops, with a deep inspiration of the breath. Children are most commonly subject to it, and it seems to depend on a specific contagion, which affects them but once in their life.

HOO'POE, an African bird which sometimes visits England; remarkable for the crest of feathers on its head. It is the *Upupa epops* of ornithologists, who place it along with the wrens and the nuthatch, in the family of *Certhiadæ*.

HOP (*hoppan: Ang. Sax.*), the *Humulus lupulus* of botanists, a climbing plant, belonging to the order of *Urticaceæ*. The female flowers are used for the purpose of imparting an agreeable aromatic bitter flavour to malt liquors, and to preserve them from fermentation. Hops are said to have been introduced into England from the Netherlands in the 16th century; and their cultivation is especially attended to in the counties of Kent, Surrey, Sussex, Worcester, and Hereford. The best method of drying hops is on a kiln over a charcoal fire; as soon as the stalks are brittle, and the top leaves easily fall off, the process is complete. When taken from the kiln they should be laid by for three weeks or a month before they are bagged. The whole process, from the time of planting to the preparation for the purposes of commerce, requires much experience and many precautions. When hops are to be kept two or three years, they must be powerfully compressed, and put into closer canvass bags than when they are to be sent immediately to market; and they must be preserved in airy lofts, neither too hot nor too cold. The produce is excessively variable, often in a tenfold proportion in different seasons and situations, being very liable to be injured by insects, by cold and continued rains, and by thunderstorms: so that a full crop is not obtained oftener than about once in five years. One of the most active constituents of the hop is a narcotic essential oil, which gives the flower its peculiar smell: its narcotic qualities were at one time so highly esteemed that a pillow of hops was commonly recommended to procure sleep when all other remedies had failed. The other important elements of the hop are a yellow resin, and a bitter principle possessed of peculiar medicinal qualities, which chemists call *lupulin*.

HOPLI'TES (*hoplitai*, from *hoplon*, arms: *Gr.*), among the Greeks, heavy-armed soldiers, who were of the first and principal class.

HOP'PER, a kind of basket in which seed corn is carried at the time of sowing. Also, the wooden trough in a mill, into which the corn to be ground is put.

HO'RARY CIR'CLES (*horarius*, hourly: *Lat.*), on globes, are hour lines or circles, marking the hours, and drawn on the equator at the distance of 15° from each other. They are meridians.——HORARY MOTION OF THE EARTH, the arc it describes in an hour, which is nearly 15 degrees. Hence, in reducing motion into time, if 15° is equal to 1 hour, 1° is equal to 4′. And the clocks at places 15° east of London are an hour faster than those in London; but the clocks at places 15° west of London are one hour later than those in London: and in proportion for any other number of degrees.

HORDE, a collective name for those migratory tribes which, like the Tartars, exist not by pasture or agriculture, but by plunder and rapine.

HORI'ZON (*horizōn*, from *horizo*, I terminate: *Gr.*), in popular language, the line where the sky meets the sea, or a plain. Astronomers distinguish between the sensible and rational horizons: the *sensible* horizon is a plane tangential to the earth's surface at the place of the spectator, extending on all sides until it is bounded by the sky. The *rational* horizon is a plane parallel to the former, but passing through the centre of the earth. It is clear that a spectator whose eye is not level with, but at any distance whatever above, the sensible horizon, can see stars, &c., that are actually below it, independently of refraction, which causes their apparent positions to be higher than those they really occupy.——ARTIFICIAL HORIZON, an instrument in which mercury is employed to form a reflecting plane, which is of course parallel with the plane of the horizon of that place. It is used in surveying and measuring heights.——HORIZON, in Painting. In every picture, the *artificial eye, or point of sight*, is conceived to be at the same height from the base line as the eye of a person supposed to be standing there. To this point everything in the picture tends, as everything in a *real* view tends to the *natural* eye. The picture then, as far as this circumstance is concerned, is perfect if the *artificial eye* and the *artificial horizon* go together; for these always bear the same relation to each other, wherever the picture may be placed.

HORN. Horn is susceptible of being cut into a great variety of forms; its properties render it an article of considerable value in the hands of the turner and other manufacturers, for combs, snuff-boxes, knife-handles, lanterns, &c. Immense quantities are annually imported from all parts of the world. With reference to structure, horns may be divided into three classes. 1. Antlers, which have the structure of bone. 2. The horns of the rhinoceros and buffalo, which consist of epidermic formations: and 3. Hollow horns like those of oxen, in which the horny matter is disposed in concentric layers round a centre of true bone.

HORN'BILL, a name given to a genus of conirostral birds, the *Buceros* of ornithologists, on account of there being a large horny protuberance on the upper mandible near the base. The species are natives of Africa and Asia.

HORN'BLENDE (called by Haüy *Amphibole*), in Mineralogy, a name given to minerals of very different external appearance. They are composed of silica, alumina, magnesia, lime, and oxide of iron. Hornblende is usually of a greenish or blackish-green colour, and forms the bases of rocks of the basaltic series. Augite is near akin to it.

HOR'NET (*hyrnette*, from *horn*, a horn: *Sax.*, on account of its horns), a strong and stinging insect, a species of the genus *Vespa*, to which the wasps belong. It constructs a nest, often as large as a man's hat, in hollow trees, thatch, &c., of the bark of the ash tree, or decayed wood gnawed in pieces, and formed, by a viscous fluid which it emits, into a kind of pasteboard.

HORN'SILVER or *Luna cornea*, names given by the alchemists to fused chloride of silver, from its resembling horn in appearance: a similar reason induced them to use the term *horn lead*. It is found abundantly in Peru, Mexico, and other parts of South America, mixed with veins of metallic silver.

HORN'STONE, in Mineralogy, a siliceous stone, having a semi-transparency resembling that of horn: it is a sub species of quartz. Its geological locality is remarkable, for it occurs in both ancient and recent formations. The hornstone found in secondary limestone is called *chert* by the English miners.

HORN'WORK, in Fortification, an outwork, which advances towards the field, and is composed of two demi-bastions, like horns, joined by a curtain.

HOROL'OGY (*hōra*, an hour; and *logos*, a discourse: *Gr.*), the principles on which the art of making clocks and watches is founded

HOROM'ETRY (*hōra*, an hour; and *metron*, a measure: *Gr.*), the art or practice of measuring time, by hours and subordinate divisions

HOR'OSCOPE (*hōra*, an hour; and *skopeo*, I examine: *Gr.*), in Astrology, a representation of the appearance of the heavens, and positions of the celestial bodies, drawn at a certain time—for instance, at the moment of a person's birth: it was supposed to indicate his future destiny.

HORSE (*hors: Sax.*), the *Equus Caballus*, a domestic quadruped that excels all others in beauty and usefulness. It is characterized by having six erect and parallel fore-teeth in the upper jaw, and six somewhat prominent in the under jaw; the dog-teeth are solitary; the molars are four on each side of each jaw until the fifth year, when a fifth grinder makes its appearance, and the displacement of the first set and the protrusion of the permanent set of teeth commence. Like all the quadrupeds of the genus *Equus*, it has an undivided hoof on each foot. The most esteemed breeds of horses are, the Barbary or Arabian, remarkable for their fleetness; the English racehorse and hunter, which combine beauty with swiftness; and the English draught-horses, which are distinguished for their size and strength, &c. In Africa, horses still maintain their original independence, and range at pleasure in herds of several hundreds, having always one or more as an advanced guard, to give an alarm at the approach of danger. This is expressed by a sudden snorting, at which the main body gallops off with the most surprising swiftness. In South America there are wild horses, the descendants of those introduced by the Spaniards and Portuguese. In Arabia, almost every man possesses his horse, which lives in the same apartment with himself and family, and is considered as constituting an important part of it. It is fed with the most regular attention, is cleaned with an incessant assiduity, and is never, on any account, ill-treated. An Arab occasionally appears to carry on a conversational intercourse with his horse, and his attachment to the animal excites in return a corresponding affection. In no country of the globe, however, has the breed of horses been more attended to than in Great Britain, nor are British horses excelled in swiftness or beauty by the coursers of Barbary or Arabia; and in supporting fatigue, they are much superior to either. But by the absurd practice of running our racehorses at two or three years old, working others long before their limbs are knit or their strength established, and cruelly exacting from them services far beyond their powers, their usefulness is soon destroyed, and their lives materially shortened. The age of a horse under eight years old is generally to be known by his teeth. The black marks, or cavities denoting the age, are to be found in the corner front teeth adjoining the tushes. At four years and a half old, the mark teeth are just visible above the gum, and the cavity is distinctly to be seen. At five, the remaining colt's teeth are shed, and the tushes appear. At six, the tushes are up, and appear white, small, and sharp, with a small circle of flesh growing near them; the horse's mouth is then completed, the corner teeth being filled up. At eight, the black marks disappear.——HORSE, in Military affairs, a body of cavalry.——In Naval affairs, a rope extending from the middle of a yard to its arms, for supporting the sailors' feet while they furl the sails; also, a rod or rope, along which the edge or corner of the sail traverses by means of hanks.——HORSE, in Printing, the sloping bench standing on the *bank*, or table, on which the pressmen set the heaps of paper before each sheet is placed on that part of the press called the *tympan*.

HORSE LAT'ITUDES, a name given by sailors to a zone of calms in each hemisphere, one on the north border of the north-east trades, and the other on the south border of the south-east trades. They move a little up and down, following the declination of the sun.

HORSE-POWER. A horse draws to the greatest advantage when the line of draught inclines a little upwards. Desaguliers and Smeaton consider the force of one horse equal to that of five men, but writers differ on this subject. The measure of a horse's power as the standard of that of machinery given by Watt is, that it can raise a weight of 33,000 pounds to the height of one foot in a minute. Its capability of draught or carriage of course diminishes as its velocity increases, and it is supposed to do most work when its speed is 2¼ miles per hour, which *happens* to be the most useful speed for the piston of a steam-engine. The nominal is very different from the effective power of a steam-engine: the latter being equal to the former, diminished by the deduction to be made on account of friction, the resistance of the air, &c., and which varies not only with different engines, but with the same engine at different times, since the overtightening of a single screw may seriously increase the amount of friction. The *nominal horse-power* is found by multiplying together the pressure in pounds on each square inch of the piston (which is less than the pressure within the boiler), the number of square inches on the surface of the piston, the number of feet traversed by the piston in its backward and forward motion, and the number of revolutions made by the crank or fly-wheel per minute, and then dividing the resulting product by 33,000. The *real* or *effective horse-power* is ascertained by means of an *indicator*, or some similar contrivance.

HORSE'-RACING, a diversion more used in England than in any other country in the world. Horse-races were common amongst the Greeks and Romans, and the place where they ran or exercised their coursers was called the *Hippodrome*, which see.

HOR'SESHOE, in Fortification, a small work of a round or oval figure, enclosed with a parapet: sometimes raised in the moat or ditch, or in low grounds; and sometimes used to cover a gate, or to serve as a lodgment for soldiers.

HOR'SE-TAIL, a cryptogamic plant, with a hollow stem, growing in wet ground, and belonging to the genus *Equisetum*.

HOR'TICULTURE (*hortus*, a garden; and *cultura*, tillage: *Lat.*), the art of cultivating a garden and rearing the finest kinds of plants. It differs from *agriculture* chiefly in being performed altogether by manual labour, and being confined within a limited space.

HOR'TUS SIC'CUS (a dry garden: *Lat.*). [See HERBARIUM.]

HOSAN'NA (save now: *Heb*.), an exclamation of joy, found only once in the Old Testament, viz Ps cxviii. 25. It was used by those who conducted Christ into Jerusalem: Matt. xxi., Mark xi., and John xii. It has been commonly adopted by the church.

HOSE (*Ger.*), among mariners, a leathern pipe for conveying water from the main-deck into the casks. Also, a leathern pipe, used with fire-engines, for conveying water to extinguish fires.

HOSE'A, a canonical book of the Old Testament, and the first of the minor prophets. The prophecies of Hosea are chiefly directed to the ten tribes before their captivity: threatening them with destruction in case of disobedience, but comforting the pious with the promise of the Messiah: and describing the happy state of the church in the latter days.

HOS'PITAL GAN'GRENE, an ulcerating gangrene, of a particularly infectious nature, which attacks wounds or ulcers in crowded hospitals.

HOS'PITALLERS, an order of religious knights, instituted about A.D. 1092, who built an hospital at Jerusalem for pilgrims. They were first styled knights of *St. John of Jerusalem*, then *Knights of Rhodes*, and finally *Knights of Malta*, these islands having been successively conferred on them. From Rhodes they were expelled by the Turks in 1522, when Charles V. granted Malta to them. A branch of them settled early in England. In London they acquired the property now known as the Temple, and the ancient gate of St. John, Clerkenwell, is a relique of another establishment.

HOSPI'TIUM (*Lat.*), a term used in old writers either for an inn or a monastery built for the reception of strangers and travellers. In the more early ages of the world, before public inns were thought of, persons who travelled lodged in private houses, and were obliged, if an opportunity presented itself, to return the favour to those that entertained them. This led to the most intimate friendship betwixt the parties, insomuch that they treated one another as relations. Hence the word *hospitium*, which properly signifies lodging or entertainment at the house of another, is used for friendship, founded upon the basis of hospitality. The word, in modern times, has been almost wholly restricted to the celebrated establishments on the St. Bernard and St. Gothard in Switzerland, intended for the preservation of travellers, or recovery of their bodies, when lost in the terrible snow-storms which often occur in those elevated and dangerous regions.

HOS'PODAR or WOIWODE, a title borne by the princes of Wallachia and Moldavia, who receive the investiture of their principalities from the grand seignior. He gives them a vest and standard; they are under his protection, and obliged to serve him, and he has even sometimes deposed them, but in other respects they are absolute sovereigns within their own dominions.

HOST (*hostia*, a victim: *Lat.*), the consecrated *wafer*, supposed by the Roman Catholics to be changed into the body and blood of Christ. The *elevation of the host* is a ceremony during the mass, &c., in which the wafer is raised aloft and worshipped; it had its rise in the 12th century. The wafer is termed a *host*, because supposed to be a *daily sacrifice* or *victim*, offered up for a propitiation.

HOS'TAGE (*otage*: *Fr.*; from *hostis*, an enemy: *Lat.*), a person given up to an enemy as a security for the performance of the articles of a treaty, and released on their fulfilment.

HOTCH'POT, a quaint legal phrase employed when it is directed in a settlement or will that any member of a class shall divide property which he may acquire with the rest of that class; this is called bringing it into hotchpot.

HOT'HOUSE, a building for the rearing of exotic plants that require heat, as well as for the early ripening of fruit.——HOT-BED, a bed of earth with horse-dung, or other manure, covered with glass: intended to raise early plants, or afford heat to such as will not thrive in the open air.

HOT'TENTOTS, natives of the southern extremity of Africa, a mild inoffensive race, both mentally and physically inferior to the Caffres. They live in filthy huts shaped like a beehive, made of mats spread over a frame of sticks. These are easily removed from place to place. A collection of them is called a kraal.

HOUND (*hund*: *Ger.*), a dog used in the chase. English hounds excel those of all other countries, not only from the climate being congenial to them, but also from the great attention paid to their breeding and management.——HOUNDS, in Naval Architecture, the sides of the mast near its head, which, like shoulders, support the rigging, &c.

HOUR (*hora: Lat.*), in its ordinary acceptation, the twenty-fourth part of a mean solar day. The Italians count twenty-four hours from sunset to sunset; astronomers, twenty-four hours from midday to midday.

HOUR'GLASS, an instrument that measures time by the running of sand from one part to another through a small aperture.

HOU'RIS (*hûr al oyûn*, black-eyed: *Arab.*), virgins in Mahomet's paradise, who, according to the description of them in the Koran, surpass in voluptuous beauty all that the imagination of mortals can conceive. They are accordingly destined to be one of the rewards of the blest

HOURS, CANON'ICAL. The seven hours of prayer to which monks and ecclesiastics in the Roman Catholic church are bound. Except in monasteries, they are said at almost any period of the day, either in parts or all together. The seven canonical hours are—*Matins*, and *Lauds*, which may be recited the afternoon or evening before, *Prime*, *Terce*, *Sext*, *None*, *Vespers*, and *Complin*. These hours must be *said*, and not *read* in the ordinary way.

HOUSE, in its primary sense, any building or edifice designed or appropriated for the habitation of man.——Among the ancient Greeks, Romans, and Jews, the houses usually enclosed a quadrangular court, open to the sky, and called the *impluvium* (*in*; and *pluvia*, rain: *Lat*), or *cavædium* (*cavus*, hollow; and *ædes*, a house: *Lat*); it was provided with channels to carry off the rain.

—HOUSE, in Astrology, the twelfth part of the heavens The division of the heavens into houses was founded upon the pretended influence of the stars, when meeting in them, on all sublunary bodies. These influences were supposed to be either good or bad, and to each of these houses particular virtues were assigned, on which astrologers prepared and formed a judgment of their horoscopes. The horizon and meridian are two circles of the celestial houses, which divide the heavens into four equal parts, each containing three houses; six of which are above the horizon, and six below it. Six of these are called eastern, and six western houses ——HOUSE, among genealogists, a noble family, or an illustrious race, descended from the same stock; as, the house of Austria, the house of Hanover.

HOU'SEBREAKING In Law, the breaking open and entering of a house by daylight, with the intent to steal, is a felony: if no theft is actually committed, it is a *misdemeanor*. The same crime committed at night is denominated a *burglary*.

HOU'SEHOLD, the whole of a family considered collectively, including the mistress, children, and servants. But the household of a sovereign prince includes only the officers and domestics belonging to his palace.——HOUSEHOLD OF THE KING. The chief officers of the royal household are:—1. The lord-chamberlain, under whom are the vice-chamberlain, groom of the stole, lords of the bedchamber, gentlemen of the privy chamber, gentlemen ushers, master of the ceremonies, gentlemen at arms, &c. 2. The lord-steward, in whose office are the treasurer and controller of the household, yeomen of the guard, &c. 3. The master of the horse, under whom are the equerries. 4 The lord high almoner. 5. The dean of the chapel royal. When there is a queen, as at present, there is a suitable modification in the subordinate offices: for example, a mistress of the robes takes the place of the groom of the stole.

HOU'SELEEK, the *Sempervivum Tectorum* of botanists, a plant with a perennial root, that grows on the roofs of houses or the tops of walls, and belongs to the *Crassulaceæ*.

HOW'ITZER (*haubitze*, from *häufen*, to fill up: *Ger.*), a kind of mortar, mounted upon a carriage like a gun. Howitzers are used to throw grenades, case-shot, and sometimes fire-balls: their principal use, however, is in the discharge of grenades.

HOW'LING MO'NKIES. These inhabit the forests of South America, and are so called from the horrible cries they utter, with which it is supposed they intimidate their enemies. The sound, 'a hollow cavernous roar,' is produced with little muscular exertion, by a drum-shaped expansion of the larynx. These monkies are untameable. They have long prehensile tails, which aid them in climbing. They form the genus *Mycetes* of naturalists.

HOY (*heu: Ger*), a small vessel for carrying passengers from one place to another.

HUE AND CRY, in Law, the common law process of pursuing a felon. The original signification of the phrase evidently was, that the offender should be pursued with a loud outcry, in order that all might hear and be induced to join in the pursuit.

HU'GUENOT (*eidgnoten*, confederates: *low Germ.*), a French word used after the year 1560 as an appellation for a Protestant. Its origin, and consequently its *literal* meaning, has received various explanations. The history of the Huguenots forms an important feature in the annals of persecution; but a detail of the sanguinary scenes would be altogether incompatible with the plan of this volume; we shall, therefore, merely remark that the religious prejudices of the people were kept alive by contending political factions, till France was nearly desolated by what were termed 'religious wars;' and at length a dreadful massacre of the Huguenots took place on St. Bartholomew's day, 1572. Henry IV., 1598, protected them by the edict of Nantes; but Louis XIV, 1685, revoked this edict, in consequence of which 500,000 Huguenots fled to Switzerland, Germany, Holland, and England, where their industry and wealth found a welcome reception.

HUIS'SIERS (*Fr.*: from the old word *huis*, a door; whence our *usher*), civil officers in France, whose attendance is necessary at every judicial tribunal, from that of a justice of the peace to the court of cassation. They answer in some respects to the clerks and criers of our courts.

HULK (*hulke*, a ship: *Ger.*), in Naval Architecture, the body of a vessel, or that part which is, in truth, the vessel itself; the masts, sails, and cordage, composing only the apparatus for its navigation. Convicts were confined in the hulks near Woolwich before being sent out of the country.

HUMAN'ITIES (*humanitas*, liberal education: *Lat.*), a term used in the Scotch schools and colleges, to signify polite literature, or grammar, rhetoric, and poetry, including the study of the ancient classics.

HUM'BLE-BEE. [See BEE.]

HUM'BOLDITE, a variety of *Datholite*, named in honour of Humboldt. It is a borosilicate of lime, and occurs in small and nearly colourless crystals, irregularly aggregated.

HU'MERUS (the shoulder: *Lat.*), in Anatomy, the upper part of the arm, between the scapula and elbow. The *os humeri* or *brachii*, as it is called, is articulated at one end to the scapula, and at the other to the ulna and radius. As to the motion of the *os humeri*, it is more free and extensive than that of any bone in the human body, being furnished with several flexor and extensor muscles.

HU'MIC ACID (*humus*, the earth: *Lat.*), or ULMIC ACID, an indefinite substance, produced by the action of powerful chemical agents on sugar, lignin, &c., or by the putrefaction of vegetable fibre.

HU'MITE, a mineral which is colourless, or of a yellow or brown colour, and a shining lustre, and is crystallized in octahedrons. It scratches glass readily: heated under the blowpipe, it becomes opaque, but does not melt: it gives, with borax, a transparent glass. It has been found at Somma, in Italy.

HUM'MING-BIRDS, a family of small birds, remarkable for the brilliant colours of their plumage. The numerous genera and species are divisible into two groups. 1. *Phæthorninæ*, which live entirely in forests, and feed chiefly on insects, being seldom seen at flowers. 2. *Trochilinæ*, which prefer open sunny places, entering the forest only when a tree is in blossom, or descending into a glade where there are flowers. 'The motions of humming-birds,' says H. W. Bates, 'are unlike those of all other birds. They dart to and fro so swiftly that the eye can scarcely follow them, and when they stop before a flower it is only for a few moments. They poise themselves in an unsteady manner, their wings moving with inconceivable rapidity, probe the flower, and then shoot off to another part of the tree. They do not proceed in that methodical manner which bees follow, taking the flowers seriatim, but skip about from one part to another in the most capricious way. Sometimes two males close with each other and fight, mounting upwards in the struggle as insects are often seen to do when similarly engaged, and then separating hastily and darting back to their work. Now and then they stop to rest, perching on leafless twigs, when they may be sometimes seen probing, from the place where they sit, the flowers within their reach. The brilliant colours with which they are adorned cannot be seen whilst they are fluttering about.'

HUM'MOCK, a name given by mariners to a hillock or small eminence of land, resembling a cone, and appearing on the seacoast of a country; also, to a sheet of ice which presents a surface generally level, but here and there diversified by projections arising from the ice having been thrown up by some pressure or force to which it has been subjected.

HU'MORAL (next), in Medicine, an epithet for whatever relates to the humours or fluids of the system.——HUMORAL PATHOLOGY is that which attributes all morbid phenomena to the disordered condition of the fluids or humours. It is opposed to the *nervous pathology*, which refers everything to the nervous energy resident in the solids, and considers diseases as arising from irregularities in the action of the nerves.

HU'MOUR (*humor*, moisture: *Lat.*), in Medicine, a word much used to express the moisture or fluids of animal bodies, or a fluid in its morbid or vitiated state.——*Aqueous humour of the eye*, a transparent fluid, occupying the space between the crystalline lens and the cornea, both before and behind the pupil.——*Crystalline humour* or *lens*, a small transparent solid body, occupying a middle position in the eye; it is the principal instrument in refracting the rays of light, so as to form an image on the retina.——*Vitreous humour*, a fluid contained in the minute cells of a transparent membrane, occupying the greater part of the cavity of the eye, and all the space between the crystalline lens and the retina.——HUMOUR, that quality of the mind which creates ludicrous images or representations. *Humour* does not possess the brilliancy and poignancy of wit. Although it is usually employed to raise mirth and render conversation pleasant, it is also often made a vehicle for satire.

HUN'DRED (*hundert*: *Ger.*), a part or division of a county, which was anciently so called from its containing a hundred families, or from its furnishing a hundred able men for the wars of the sovereign. After Alfred divided this kingdom into counties, and gave the government of each to a sheriff, they were subdivided into hundreds, of which the constable was the chief officer. By various statutes, hundreds are liable to actions for injuries sustained by the riots, robberies, malicious mischiefs, &c., committed within them.

HUNT'ING (*huntian*, to hunt; from *hund*, a dog: *Sax.*), the act or diversion of pursuing wild animals. In a rude state of society, it is one of the most important employments of mankind: in a more advanced state, it becomes an agreeable amusement, and is practised in a great variety of ways, according to the country and the description of the game. In England, the fox, the stag, and the hare, are the principal objects of the chase; on the continent of Europe, the wild boar and the wolf are added to the list. Dionysius, who lived 50 B.C., says that the inhabitants of the northern part of this island tilled no ground, but lived in great part upon the food they procured by hunting. Strabo, who was nearly contemporary with him, also says, that the dogs bred in Britain were highly esteemed upon the continent, on account of their excellent qualities for hunting. As early as the 9th century, it formed an essential part of the education of a young nobleman. Alfred the Great was an expert and successful hunter before he was twelve years of age. Among the tributes imposed by Athelstan after a victory over Constantine, king of Wales, were, 'hawks and sharp-scented dogs, fit for hunting of wild beasts.' Edward the Confessor took the greatest delight in following a pack of swift hounds in pursuit of game, and cheering them with his voice. To the passion for hunting which animated the feudal kings and nobles of Europe, the vast tracts of land which were afforested bear fearful testimony; and the writers of the time give a strong picture of the sufferings of the oppressed commonalty under the tyrannical privileges of sport which were claimed by their masters. In the reign of Edward II., hunting was reduced to a perfect science, and rules were established for its practice; these were afterwards extended by the *master of the game* belonging to Henry IV., and drawn up for the use of his son Henry, prince of Wales, in two tracts, which are extant. Edward III., according to Froissart, while at war with France, and resident there, had with him sixty couples of stag-hounds, and as many hare hounds, and every day hunted or hawked. Gaston, earl of Foix, a foreign nobleman, contemporary with Edward, also kept 600 dogs in his castle for hunting. The bishops and abbots of the middle ages hunted with great state, and some of them were skilful sportsmen. One of these ecclesiastics, an archbishop of York, in 1321, carried with him a train of 200 persons, who were maintained at the expense of the abbeys on his road, and who hunted with a pack of hounds from parish to parish.

HU'ON PINE, a lofty coniferous tree, growing in Tasmania, and known to botanists as *Microcachrys tetragona*.

HUR'RICANE (*huracan : Span.*, from the Indian *ouragan*), a most violent storm, generally accompanied with thunder and lightning. Hurricanes are most common in the West Indies, the Isle of France, and the kingdoms of Siam and China. The velocity of the wind is terrible; corn, vines, sugar-canes, trees, houses, everything is swept away. The hurricane of the temperate zone moves with a velocity of about sixty feet in a second: those of the torrid zone, from 150 to 300 feet in the same time. They appear to have an electric origin, and begin in various ways; sometimes a little black cloud rolls down the mountains, suddenly unfolds itself, and covers the whole horizon; at others, the storm comes on in the shape of a fiery cloud, which appears in a calm and serene sky. A hurricane is generally preceded by an awful stillness of the elements, and a closeness and a mistiness in the atmosphere, which makes the sun look red, and the stars larger than usual.

HUS'BANDRY, the practical part of the science of agriculture, or the business of cultivating the earth and rearing animals. Husbandry is the proper term for that which is commonly called farming. It includes tillage, breeding, grazing, the management of the dairy, and every other occupation by which riches may be drawn from the superficial products of the earth. [See AGRICULTURE.]

HUSSARS' (*husz*, twenty; and *ar*, pay: *Hung.*), the name by which certain cavalry regiments are distinguished. It was originally given to the cavalry of Hungary, raised in 1458, when Matthias I. ordered the prelates and nobles to assemble with their cavalry in his camp. Every twenty houses were obliged to furnish a man; and hence the name. In the British army, there are thirteen regiments of hussars. Their equipments are light and elegant: their arms are a sabre, a carbine, and a pair of pistols

HUS'SITES, the disciples of John Huss, a Bohemian, and curate of the chapel of Bethlehem at Prague, who, about the year 1414, embraced and defended the opinions of Wickliffe of England; for which he was cited before the council of Constance, and, refusing to renounce his supposed errors, condemned to be burnt alive, which sentence was accordingly executed upon him at Constance This gave rise to a rebellion of the Hussites, who avenged his death by one of the fiercest and most terrible civil wars ever known. The pope and cardinals, with a pretended unwillingness to shed human blood, handed him over to 'the secular arm,' and earnestly pressed for his execution, though he had come to the council furnished with a safe-conduct from the emperor Sigismund, which that monarch had the baseness to violate It was most explicit, stating 'that he was to go, stop, remain, and return in safety.'

HUS'TINGS (*hus*, a house; and *ting*, judgment: *Sax.*), the principal court of the city of London, held before the lord mayor and aldermen. No actions which are merely personal can be brought in this court.—— Also, in common language, the booth or elevated place, where candidates at a parliamentary election are proposed and address their constituents

HUTCHINSO'NIANS, the defenders of the philosophy of John Hutchinson, who was born in the year 1674. Hutchinson disapproved of Newton's doctrine of gravity. He considered the Old Testament to embrace a complete system of natural philosophy as well as religion.

HY'ACINTH (*huakinthos*: *Gr.*), the common name of some bulbous rooted plants belonging to the genus *Hyacinthus*, nat. ord. *Liliaceæ*. In Holland, the fondness for the *H. orientalis* at one time amounted to a complete mania.—— HYACINTH, in Mineralogy, one of the names given to the yellow or brown crystals of *zircon*, which are found in the beds of streams and rivers, particularly in Ceylon. Its most usual form, as a crystal, is a four-sided prism, terminated by four rhombic planes.

HY'ADES (*uein*, to rain: *Gr.*), a cluster of stars, in the forehead of the bull, five of which, arranged in the figure of a V, are seen by the naked eye. In Greek mythology the Hyades were the five daughters of Atlas, king of Mauritania, who died of grief when their brother Hyas was killed by a wild boar, when they were changed into stars. The ancients connected the rising and setting of these stars with rain, whence the name.

HYÆ'NA or Hyena (*huaina: Gr.*), a genus of digitigrade and carnivorous quadrupeds, characterized by having no tuberculous teeth or small teeth behind the carnivorous. The neck of this animal is very thick, and covered with a kind of bristles instead of hairs, which naturally stand erect, and give it a very formidable appearance; the body is bulky and rounded, and the shape not unlike that of a hog; the legs are moderately long and very strong; and the general colour is a very dusky olive. It inhabits Turkey, Syria, Persia, and Barbary, living in caverns and rocky places, and prowling about at night to feed on the remains of dead animals. Naturalists have described three species of the hyæna, the most common being the *striped* hyæna, or *hyæna vulgaris*. It is not very swift, but continually lies in wait for other animals, and scarce anything that comes in its way escapes it.

HY'BRID (*hybrida: Lat.*), the produce of a female plant or animal which has been fecundated by a male of a different species or genus.

HYDAR'THRUS (*hudor*, water; and *arthron*, a joint: *Gr.*), a peculiar and dreadful disease of the joints, commonly termed the white swelling. The knee, ankle, wrist, and elbow are the joints most subject to it; but the skin is not at all altered in colour. It is distinguished from a *rheumatic* swelling, by a fixed and wearing pain preceding the tumefaction, often for a considerable period; also, by the general state of the health.

HY'DATID (*hudatis*, a watery vesicle: *Gr.*), a vesicle or bladder, distended with an aqueous fluid, which is found in the bodies of animals. They vary in size from the dimensions of a pea to that of a child's head. They have been considered to be formed by young entozoa, but Professor Owen says that the hydatid ought rather to be considered as an abnormal organic cell than as a species of animal, even of the simplest kind.

HY'DRA (*Hudra: Gr.*), a fabulous monster with many heads, said to have infested the lake of Lerna, in the Peloponnesus. According to the fable, when one of the heads was cut off, it was immediately succeeded by another, unless the wound was cauterized. But Hercules killed this monster by applying firebrands to the wounds as he cut off the heads.——Hydra, in Natural History, a genus of freshwater polypes, of which there are several species, some of which are found in this country; of these, the principal is *Hydra viridis*, having about ten tentacles shorter than the body. It inhabits stagnant waters, and is found on the surface of plants. In the quiescent state, it appears, at first sight, like a little transparent green jelly; but when expanded, it is a linear body, fixed at one end, and surrounded at the other by tentacles or arms placed in a circle round the mouth. It generally produces its young from the sides: these, at first, seem small papillæ, increasing in length till they assume the form of the parent, and then drop off. The whole tribe has a most wonderful faculty of reproducing parts which have been destroyed; and if cut or divided in any direction, each separate part becomes a perfect polype, as slips of certain plants become the same plants in perfect form.——Hydra, in Ancient Astronomy, a southern constellation, representing a water-serpent.

HY'DRAGOGUE (*hudragōgia*: from *hudōr*, water; and *ago*, I carry off: *Gr.*), a medicine that possesses the property of promoting the discharge of watery humours.

HYDRAN'GEA (*hudōr*, water: and *angos*, a vessel: *Gr.*), in Botany, a genus of plants, nat. ord. *Saxifragaceæ*. The commonest species, *H. hortensis*, has fine corymbs of light rose-coloured flowers, which retain their freshness for a long time, and succeed each other until late in the autumn.

HYDRAR'GYRUM (*hudrarguros*: from *hudōr*, water; and *arguros*, silver: *Gr.*), a name given to quicksilver, or mercury, on account of its liquid state and great mobility. [See Mercury.]

HY'DRATE (*hudōr*, water: *Gr.*), in Chemistry, a solid which contains water in a fixed state, as slaked lime, &c.

HYDRAU'LIC LIME, a lime formed from the poorer sorts of limestone, containing from 8 to 25 per cent. foreign matter, as silica, alumina, magnesia, &c. All water limestones are of a bluish-grey or brown colour, communicated to them by oxide of iron. They are generally termed *stone lime*, but improperly so, since their hardness or softness has nothing to do with their properties. After being calcined, they do not *slake* when moistened; but, if pulverized, they absorb water without swelling up, or heating, like *fat* lime, and afford a paste which, in the air, never acquires much solidity, but becomes hard under water in a few days. The silex and alumina are essential, but the oxides of iron and manganese are rather prejudicial ingredients.

HYDRAU'LIC PRESS, a machine which affords an enormous power of compression. It consists, essentially, of two strong cylinders of metal, communicating by a pipe, and having, each of them, a solid piston working water-tight in it. When water is forced into the larger by the smaller, which is, in effect, a *force-pump*, the larger piston is driven up with a pressure as much greater than the power applied to the smaller, as a cross section of the former is greater than a cross section of the latter. Let the diameter of the larger piston be 8 inches, and that of the smaller one-fourth of an inch: a cross section of the larger will be 896 times as great as a cross section of the smaller; and a force of 1 cwt. exerted on the smaller will produce a pressure of 896 cwt., or nearly 45 tons, on the larger. Some presses are constructed capable of exerting a pressure of hundreds of tons. To save time, a larger force-pump is used at first, and then, when extreme pressure is required, the smaller one.

HYDRAU'LIC RAM (*hudōr*, water; and *aulos*, a pipe; *Gr.*), a machine for raising water, depending on the difference between the momenta of water at rest and in motion. Water, running down an inclined pipe, acquires a momentum, which enables it to close, by a loaded valve, the aperture through which it escaped, and open another valve so as to ascend a vertical pipe. The very stoppage of the water from running off immediately destroys its momentum, and the valves fall back—one of them closing, so as to prevent the water which had been thrown up into the vertical pipe from flowing back; and the other opening, so as to allow the water to flow away again, and thus produce a new momentum which repeats the process. Every new impulse throws water up the vertical pipe, and a very low *head* of water is capable of elevating the fluid to a considerable height. A small stream, with this contrivance, will supply fountains, cisterns at the top of a house, &c.

HYDRAU'LICS, that branch of hydrostatics which teaches to estimate the velocity of moving inelastic fluids. It is this important science that furnishes the principles upon which the engines are constructed by which water is raised. It treats of pumps, fountains, and a variety of useful machines, by which the force of fluids is applied to practical purposes.——The Romans displayed their acquaintance with the art of conveying water, in their famous aqueducts. It is, however, only within the last three centuries that this subject has attracted any particular notice.

HYDRIOD'IC A'CID, a gaseous compound, consisting of hydrogen and iodine. It is rapidly absorbed by water; and is instantly decomposed by chlorine, iodine being set free.

HYDROBRO'MIC A'CID, a gaseous compound, consisting of hydrogen and bromine.

HYDROCAR'BON, a compound of hydrogen and carbon. These elements unite in a variety of definite proportions, forming several interesting gaseous, liquid, and solid compounds, usually called *hydrocarburets* or *hydrocarbons*. Among these are *light carburetted hydrogen* or *fire damp olefiant gas*, *spirit of turpentine*, *paraffine*, *naphtha*, and *petroline*.

HYDROCAR'DIA (*hudōr*, water; and *kardia*, the heart: *Gr.*), in Medicine, dropsy of the heart.

HYDROCEPH'ALUS (*hudrokephalon*: from *hudōr*, water; and *kephalē*, the head: *Gr.*), in Surgery, dropsy of the brain, or water in the head. The acute form of this disease is almost confined to childhood. The ventricles of the brain are the principal seat of the watery accumulation, which is indicated by febrile symptoms, pain in the head, and, in very young children, enlargement of it. The eyes, which are not closed entirely in sleep, are irregularly directed, and have their pupils dilated. There is delirium, and often coma, convulsions, and paralysis.

HYDROCHLO'RATE, in Chemistry, a compound of hydrochloric acid, or muriatic acid gas, with a base.

HYDROCHLO'RIC A'CID, a gaseous compound of hydrogen and chlorine, evolved when sulphuric acid is added to common salt. It has a very strong affinity for water, the absorption of the vapour of which from the atmosphere produces the fumes perceived when it escapes into it. A solution of the gas in water forms the muriatic acid of the shops. Common salt is a muriate of soda. Hydrochloric acid is styled chlorhydric acid by the French chemists.

HYDROCYAN'IC A'CID (*hudōr*, water; and *kuanos*, blue: *Gr.*), *Prussic acid*, a compound of hydrogen and cyanogen. It is a most deadly poison. Even the prussic acid of the shops, which is a weak solution of the acid in water, is extremely dangerous, unless used with great caution. Its fatal effects are so rapid, that it is impossible to prevent them by any antidote. The smallest quantity of the pure acid applied to the eye of a cat, &c., causes instantaneous death. If there is the least hope of saving one who has swallowed it, a solution of chlorine, which decomposes it, should be administered; also ammonia, which both combines with it and acts as a stimulant. It is a narcotic; and, given with great caution, it may be used as a powerful sedative and anti-irritant, especially in whooping-cough. It is contained in the leaves of the cherry-laurel, in bitter almonds, in the kernels of plums and peaches, and the seeds of the apple, which derive their peculiar odour from it. It was originally obtained from Prussian blue (which see); hence its popular name.

HYDRODYNAM'ICS (*hudōr*, water; and *dunamis*, power: *Gr.*), the science which treats of the forces of liquids in motion. It comprehends *hydraulics*. [See HYDROSTATICS.]

HYDROFLUOR'IC A'CID, in Chemistry, a gaseous substance obtained from fluor spar, which is a fluoride of calcium. It is of a corrosive nature, and will dissolve glass, for which reason it is used for etching on glass. This acid, which consists of fluorine and hydrogen, readily combines with water; and when it is dropped into that fluid, a hissing noise is produced, with the evolution of considerable heat. Its odour is very penetrating, and its vapour dangerous to inspire. When applied to the skin, it instantly disorganizes it, and produces the most painful wounds. It is sometimes, but very rarely, called *fluoric acid*.

HY'DROGEN (*hudōr*, water; and *gennao*, I produce: *Gr.*), in Chemistry, one of the gaseous elements and a constituent of water. Whatever process decomposes water will produce hydrogen gas, provided the oxygen of the water be absorbed by any other substance, as is seen in the following experiments. If water is dropped gradually through a gun-barrel, or iron pipe, made red-hot in the middle, the water will be decomposed; the oxygen will form an oxide or rust with the iron, and the hydrogen will come out pure from the opposite end. If a red-hot iron is plunged into water, the hydrogen rises with the vapour, and is known by a peculiar smell. This gas is fourteen times lighter than common air, its specific gravity being about 0·0692; hence it has been applied to the filling of balloons. It is also highly inflammable under certain circumstances; hence it was formerly known by the name of *inflammable air*. It is incapable of supporting respiration or combustion, burning only in consequence of its strong attraction for oxygen. It may be obtained by putting a few pieces of zinc, or a few small iron nails, into a mixture of equal parts sulphuric acid and water. The oxygen of the water combines with the zinc, and this compound is attacked by the acid whilst the hydrogen is set free. Mixed with three or four times its volume of air, it is highly explosive, and hence must not be set on fire as it issues from the bottle in which it is evolved, until all the common air has been expelled by it. When quite pure it is tasteless, colourless, and without smell. It combines with sulphur, phosphorus, &c. The gas employed to illuminate our streets is a combination of hydrogen and carbon

HYDROG'RAPHY (*hudōr*, water; and *graphē*, a description: *Gr.*), the art of measuring and describing rivers, bays, lakes, gulfs, channels, and other collections of water.

HY'DROLITE (*hudōr*, water; and *lithos*, a stone: *Gr.*), in Mineralogy, a silicate of alumina, iron, and potash, containing nearly 80 per cent of *water*.

HYDROL'OGY (*hudōr*, water; and *logos*, a discourse: *Gr.*), that department of philosophy which treats of and explains the nature and properties of waters in general.

HY'DROMEL (*hudōr*, water; and *meli*, honey: *Gr.*), a liquor consisting of honey diluted with water. Before fermentation, it is called *simple hydromel*; after fermentation, *vinous hydromel*, or *mead*.

HYDROM'ETER (*hudōr*, water; and *metron*, a measure: *Gr.*), an instrument for measuring the specific gravities of liquids, and thence the strength of spirituous liquors, these being inversely as their specific gravities. The hydrometer is sometimes of brass, at others, when for fluids which would act upon the metals, of glass. It has a bulb about an inch and a quarter in diameter; from this project upwards a longer stem, which is graduated, and downwards a shorter, which is terminated below by a small heavy bulb, intended by its weight to keep the instrument vertical when immersed in fluid. The lighter the fluid the deeper the immersion, the amount of which is shown by the graduated stem. Syke's hydrometer, used by the excise regulations for taking the specific gravity of spirituous liquors, has several small weights which may be placed on the lower bulb. The same graduated stem is, therefore, equivalent to several, since its indications have different values, according to the weight placed on the lower part of the instrument. In making experiments with the hydrometer, temperature must be carefully taken into account, since the higher the temperature of a liquid the less dense it is. The use of the hydrometer depends on the following propositions:—1. It will sink in different fluids in an inverse proportion to the density of the fluids; 2. The weight required to sink it equally far in different fluids will be directly as the densities of the fluids.

HYDROP'ATHY (*hudōr*, water; and *pathos*, disease: *Gr.*), a term applied to a treatment of disease generally called the *cold-water cure*. It was suggested in 1826, by Vincent Priessnitz, of Graefenberg in Silesia, and consists in the internal and external administration of cold water, accompanied by air and exercise, early hours, and strict attention to diet. Such a mode of treatment, rationally pursued, must be obviously useful to persons residing in populous towns, eating and drinking too much, and keeping bad hours.

HY'DROPHANE (*hudōr*, water; and *phaino*, I make to appear: *Gr.*), in Mineralogy, a variety of the opal, which is rendered transparent by immersion in water.

HYDROPHO'BIA (*hudōr*, water; and *phobeomai*, I fear: *Gr.*), a symptom of canine madness, or the disease itself. This name was given to the disease because persons bitten by a rabid dog or cat dread the sight of water. According to the generally received opinion of medical practitioners, there is no known cure for this terrible disease; and the only preventive to be relied upon is the complete excision of the bitten part, which should be performed as soon as possible; and caustics, of which nitric acid is considered to be the best, should be applied to the wound. Unfortunately, the first symptoms of madness in a dog are not very well defined; the animal is generally observed to be dull and unsociable, refuses food, hangs his head, appears drowsy, flies at strangers, and hardly recognizes his master. At some indefinite period after the bite, and long after the wound has healed, there is itching and pain in the part; heaviness, great restlessness and uneasiness, with mental alarm, followed by pains about the neck, sense of choking and great horror at any attempt to drink, though solid food may be swallowed. These symptoms are followed by fever, difficult respiration, convulsions, sometimes delirium, and finally death.

HYDROPHTHAL'MIA (*hudōr*, water; and *ophthalmos*, the eye: *Gr.*), in Medicine, dropsy of the eye.

HY'DROPS (*hudrōps*: *Gr.*), in Medicine, the dropsy, a preternatural collection of serous or watery fluid in the cellular substance, or different cavities of the body. It receives various appellations, according to the particular situations in which the fluid is lodged; as *hydrocephalus*, *hydrothorax*, &c.

HY'DROSCOPE (*hudōr*, water; and *skopeo*, I examine: *Gr.*), an instrument formerly used for measuring time. It was a kind of water-clock, consisting of a cylindrical tube conical at the bottom; the cylinder was graduated, or marked with divisions; and as the surface of the water, which trickled out at the point of the cone, successively sank to these several divisions, it pointed out the hour.

HYDROSTAT'IC BAL'ANCE, a kind of balance contrived for finding the specific gravities of bodies, solid as well as fluid.

HYDROSTAT'IC BEL'LOWS, a machine for showing that fluids transmit pressure equally in every direction. It consists of two flat boards united water-tight with leather, &c., and having the appearance of a bellows; a tube three or four feet long with a funnel at its upper end, communicates with the space between the boards. When water is poured in through the tube, the upper board will rise, and will sustain a weight equal to that of a column of water having a base equal to that of the bellows, and a height equal to that of the tube. A person standing on the upper board and blowing into the tube may easily lift himself up.

HYDROSTAT'IC PAR'ADOX, a term employed to designate that principle in hydrostatics by which any quantity of water, however small, may be made apparently to balance another however great. The small quantity does not in reality balance the larger; for the extra pressure is borne by the sides of the vessel in which it is placed. But, from the nature of fluids, a given pressure exerted by a smaller quantity of fluid may be made to produce a very great pressure in a larger quantity with which it communicates.

HYDROSTAT'IC PRESS, a name sometimes given to the *hydraulic press*, which see.

HYDROSTAT'ICS (*hudōr*, water; and *stao*, I stand: *Gr.*), that branch of science which treats of the equilibrium of fluids. *Hydrodynamics* treats of fluids in motion, and *hydraulics* of machines having a reference to fluids. The science is founded on the fact that 'when a liquid mass is in equilibrium, every one of its molecules sustains and imparts an equal pressure in all directions.' Hence water will rise to the same level in any number of open vessels which communicate. The pressure on a surface depends, not on the absolute amount of fluid, but on the extent of the surface, and the mean height of the columns of fluid above it—supposing all of them to reach to an imaginary horizontal plane just touched by the highest. That is the pressure on any surface will be equal to that surface multiplied by the depth of its centre of gravity below the upper surface of the fluid. The base of any vessel will sustain the same pressure, whether the vessel is conical, cylindrical, or otherwise, so long as its surface, and the height of the highest column of fluid resting upon or in connection with it, continue the same. There will be much less fluid in the cone than in a cylinder of the same base and height, yet the pressures on their bases will be equal. Hence the presure on the base of a vessel may be greater, to any amount, than the weight of the water which produces it—in the case, for example, of a vessel formed of two horizontal plates, having an extremely thin water-tight space between them, and communicating with a vertical pipe of very small bore. Let this very thin space, for example, be 4 square feet in extent, and let the height of the tube which communicates with it be 33 feet: the pressure on the upper and under interior surfaces of the vessel will each be equal to the weight of a column of water having a base of 4 square feet and a height of 33 feet; that is, 576, the number of square inches multiplied into 15 lbs., or 8640 lbs., equal to 432 tons; and yet the water may not weigh more than a few ounces. This enables us to understand the danger of thin crevices behind the walls or under the banks of canals, &c. A strong cask may easily be burst if, when it has been filled with water, a long vertical tube, no matter how slender, is screwed into it, and also filled with that liquid. When a body is placed in a fluid of less specific gravity than itself, it displaces a quantity of the fluid equal to it in weight, but not in bulk; when in a fluid of greater specific gravity, it displaces a quantity equal to it in bulk, but not in weight; and when in a fluid of the same specific gravity, it displaces a quantity equal to it, both in weight and bulk, and it will remain at rest wherever it is placed.

HYDROSUL'PHURET, in Chemistry, a combination of hydrosulphuric acid, or sulphuretted hydrogen.

HYDROTHO'RAX (*hudōr*, water; and *thōrax*, the trunk of the body: *Gr.*), in Medicine, dropsy of the chest. The symptoms are, difficult breathing when in a recumbent position, paleness, cough, thirst, swelling in the legs and feet, quick, often irregular, and intermitting pulse.

HY'GIENE (*hugieia*, health: *Gr.*), that branch of medicine which relates to the means of preserving public health.

HYGROM'ETER (*hugros*, moist; and *metron*, a measure: *Gr.*), an instrument which shows the presence of water in the air, and its variation in quantity, and affords data for calculating the actual quantity existing in a given bulk of air at any given time. There are many kinds of hygrometers; for whatever body either swells or shrinks, by dryness or moisture, is capable of being formed into one. The higher the temperature of air, the larger the quantity of vapour it is capable of holding in solution. That point of temperature at which the quantity of moisture it contains would just saturate it, is called its *dew point*; if it be cooled ever so little below this point, it will begin to deposit moisture in the form of dew The hygrometric condition of the air is now usually deduced from an observation of the *dew point*, and this may be ascertained either by the use of instruments such as Daniell's hygrometer, which gives the dew point by direct observation, or by means of the wet and dry bulb thermometers, which afford data for its calculation.

HYLOBA'TES (*hulobates*, a wood-walker: *Gr.*), a genus of long armed apes, natives of India. They have neither tails nor cheek pouches. When domesticated, their manners are gentle. The Gibbon (*H. lar*) belongs to this genus. When this ungainly animal is standing upright its fingers reach to the ankles. The hands and feet are white and there is a white circle round the face, the rest of the body being black. It lives in trees and swings by its arms with great agility from branch to branch. The *wow wow* or *oungha*, so called from its cry, is the *H. agilis* of zoologists.

HYMENOP'TERA (*humēn*, a membrane; and *pteron*, a wing: *Gr.*), an order of insects having four naked membranous wings, with a few nervures. The posterior pair are much smaller than the front pair. During flight the wings on each side are linked together by means of a series of small hooks on the front edge of the hinder wing, which catch hold of the hindmost vein of the fore wing. During repose the wings are laid over each other on the back. The abdomen of the female is terminated by an ovipostor. Bees and wasps belong to this order.

HYOSCYA'MIA (*hyoscyamos*, henbane: *Gr.*), in Chemistry, the active principle or alkaloid of henbane.

HYPAL'LAGE (*hupallagē*, an exchange: *Gr.*), in Grammar and Rhetoric, a figure consisting of a mutual change of cases: thus, *gladium vaginâ vacuum*, 'the sword empty of the scabbard.'

HY'PER (*huper*), a Greek word signifying *over*, which is used in English composition to denote excess, or something *over* or beyond what is found in other circumstances. Thus, in Chemistry, *hypersulphuric acid*, an acid which contains more oxygen than sulphuric.

HYPER'BATON (*huperbaton*, a transposition: *Gr.*), in Grammar a figurative construction, inverting the natural and proper order of words and sentences. The species are the *anastrophe*, *hypallage*, *husteron-proteron*, &c.; but the proper hyperbaton is a long retention of the verb which completes the sentence.

HYPER'BOLA (*huperbolē*, an excess: *Gr.*,—because the angle which its plane forms with the base of the cone is greater than that of the parabola), in Geometry, a curve formed by cutting a cone in such a direction, with regard to its axis, that if the cutting plane were produced, it would cut also the opposite cone—two hyperbolas being produced, the one *opposite* to the other. [See CONIC SECTIONS.]——HYPERBOLIC SPACE, the space or content comprehended between the curve of the hyperbola and the whole ordinate.

HYPER'BOLE (same *deriv.*), in Rhetoric, a representation of anything carried beyond the bounds of truth or even probability: as, 'he ran swifter than the wind:' 'he went slower than a tortoise,' &c. Aristotle observes, that the hyperbole is the favourite figure of young authors, who love excess and exaggeration; but that philosophers should not use it without a great deal of caution.

HYPER'BOLOID *huperbolē*, an hyperbola; and *eidos*, form: *Gr.*), in Geometry, a solid generated by the revolution of an hyperbola about its axis.

HYPERBO'REANS (*Huperboreioi*: from *huper*, beyond, and *Boreas*, the north wind: *Gr.*), the name given by the ancients to the unknown inhabitants of the most northern regions of the globe, who were believed always to enjoy a delightful climate, on account of being situated beyond the domain of Boreas, or the north wind. They were, in fact, the Laplanders, the Samoiedes and the most northern of the Russians.

HYPERCATALEC'TIC (*huperkatalēktikos*: from *huper*, above; and *katalēktikos*, deficient: *Gr.*), in Greek and Latin poetry, a verse which has a syllable or two beyond the regular and just measure.

HYPERCRIT'IC (*huper*, signifying excess; and *kritikos*, critical: *Gr.*), one who is critical beyond measure or reason; animadverting on faults with unjust severity, and shutting his eyes to the merits of a performance.

HYPER'METER (*huper*, beyond; and *metron*, a measure: *Gr.*), a verse containing a syllable more than the ordinary measure. When this is the case, the following line begins with a vowel, and the redundant syllable of the former line blends with the first of the following.

HY'PERSTHENE, in Mineralogy, Labrador hornblende, a ferrosilicate of magnesia, with traces of alumina and lime. It occurs both crystalline and massive, is resplendent and of a grey-green or reddish hue.——*Hypersthene Rock*, an igneous rock composed of pale red, white or greenish felspar and hornblende either in large crystals or small concretionary masses.

HYPER'TROPHY (*huper*, beyond; and *trophē*, nourishment: *Gr.*), a morbid increase in any organ without change in the nature of its substances.

HY'PHEN (*huphen*, literally, into one *Gr.*), a mark or character implying that two words are to be connected; as *pre-established*, *five-leaved*, &c. Hyphens also serve to show the connection of such words as are divided by one or more of the syllables coming at the end of a line.

HYPNOT'IC (*hupnos*, sleep: *Gr.*), an epithet applied to such medicines as have the quality of producing sleep.

HYPOB'OLE (*hupobolē*, a suggesting: *Gr.*), in Rhetoric, a figure in which several things are mentioned that seem to be in favour of the opposite side, and each of them is refuted in order.

HYPOCHON'DRIA (*hupochondria*: from *hupo*, under; and *chondros*, the cartilage of the breast-bone: *Gr.*), in Anatomy, the sides of the belly covered by the inferior ribs and their cartilages: it is distinguished into the *right* and *left hypochondria*.

HYPOCHONDRI'ASIS (same *deriv.*), in Medicine, an affection characterized by dyspepsia, languor and want of energy, by sadness, and fear, arising from uncertain causes, and by a melancholic temperament. The principal causes are sorrow, fear or excess of any of the passions; too long continued watching; and irregular diet. *Hypochondriacs* are continually apprehending future evils; and in respect to their feelings and fears, however groundless, there is usually the most obstinate belief and persuasion.

HY'POCIST (*hypociste*: *Fr.*; *hupokistis*: from *hupo*, under; and *kistos*, the cistus: *Gr.*), or *Succus hypocistidis*, in Pharmacy, the inspissated juice of the *Cytinus hypocistis*, a parasitical plant found on the roots of several kinds of *cistus* in the south of Europe.

HYPOCRATER'IFORM (*hupo*, under; *kratēr*, a cup; *Gr.;* and *forma*, a shape; *Lat.*), in Botany, a tubular corolla, but suddenly expanding into a flat border above: as in the flower of the *Phlox*.

HYPOGÆ'OUS (*hupogaios:* from *hupo*, under; and *gē*, the earth: *Gr.*), in Botany, a term used to denote all parts of the plant which grow under the surface of the earth.

HYPOGAS'TRIC (*hupogastrion*, the hypogastrium: from *hupo*, under; and *gastēr*, the belly: *Gr.*), in Medicine, relating to the *hypogastrium*, or middle part of the lower region of the belly. Also, an appellation given to the internal branch of the iliac artery.

HYPOGAS'TROCELE (*hupogastrion*, the hypogastrium; and *kēlē*, a hernia: *Gr.*), in Surgery, a *hernia*, or rupture, of the lower belly.

HY'POGENE ROCKS (*hupo*, under; and *ginomai* to be born: *Gr.*), those rocks which have not assumed their present form and structure at the surface, but were thrust up from below: as granite, gneiss, and other crystalline formations. This term, which includes both the plutonic and metamorphic rocks, is substituted for *primary*, because granitic and gneissic rocks have been found amongst rocks of the secondary and tertiary periods.

HYPOGE'UM (*hupo*, under; and *gē*, the earth: *Gr.*), a name given by ancient architects to all the parts of a building which were under ground; as the cellar, &c.

HYPOG'YNOUS (*hupo*, under; and *gunē*, a female: Gr.), in Botany, a term applied to stamens that spring from below the base of the ovarium.

HYPONI'TROUS A'CID, in Chemistry, a combination of nitrogen and oxygen, intermediate between nitric oxide and hyponitric acid. It contains one atom of nitrogen and three atoms of oxygen. Its salts are termed *hyponitrites*.

HYPOPHOS'PHOROUS A'CID, in Chemistry, an acid containing two atoms of phosphorus and one atom of oxygen. Its salts are termed *hypophosphites*.

HYPOS'TASIS (*hupostasis:* from *hupo*, under; and *istēmi*, I stand; *Gr.*), in Theology, a term used to denote the subsistence of the Father, Son, and Holy Spirit, in the Godhead, called by the Greek Christians, three *hypostases*. The Latins more generally used *persona*, and this is the modern practice: hence we say, the Godhead consists of three *persons*.

HYPOSULPHU'RIC A'CID, in Chemistry, an acid intermediate between the sulphurous and sulphuric acids; it contains two atoms of sulphur and five of oxygen. Its salts are termed *hyposulphates*.

HYPOSUL'PHUROUS A'CID, in Chemistry, an acid consisting of an equal number of atoms of sulphur and oxygen. Its salts are termed *hyposulphites*.

HYPOTH'ENUSE or HYPOT'ENUSE (*hupo*, under; and *teino*, I stretch: *Gr.*), in Geometry, the subtense or longest side of a right-angled triangle, or the line that subtends the right angle.

HYPOTH'ESIS (*hupothēsis:* from *hupo*, under; and *tithēmi*, I place: *Gr.*), a principle taken for granted, in order to draw from it a conclusion for the proof of a point in question. Also, a system or theory imagined or assumed to account for what is not understood.

HYPOTRACHE'LIUM (*hupotrachelion:* from *hupo*, under; and *trachēlos*, the neck: *Gr.*), in Architecture, the slenderest part of the column; being that immediately below the neck of the capital.

HYPOTYPO'SIS (*hupotupōsis*, a sketch: *Gr.*), in Rhetoric, the use of descriptive language, highly enriched with rhetorical figures.

HYPSO'METRY (*hupsos*, height: *metron*, measure: *Gr.*), the art of measuring altitudes. Various methods are adopted:—1. By triangulation, the theodolite or some equivalent instrument being employed. 2. By the mercurial barometer. As the pressure of the atmosphere decreases the higher we ascend, the mercury will fall in its tube in proportion to the height to which the instrument is carried. When possible, two corresponding barometers should be simultaneously observed, one at the level of the sea or at the foot of the height to be measured, and the other on the summit. The difference of the readings affords a datum for calculations in which the temperature of the two stations and some other circumstances must be taken into consideration. 3 By the Aneroid barometer, by which differences of atmospheric pressure are measured by means of metallic springs. 4. By observation of the boiling point of water. At the level of the sea, water boils at the temperature of 212° F., but as we ascend, the lessened pressure allows ebullition to take place at a lower temperature, and hence we obtain materials for calculation.

HYS'SOP (*hussōpos: Gr.*), a genus of labiate plants, one species of which is cultivated for use. The leaves have an aromatic smell and a warm pungent taste.

HYSTER'ICS or HYSTE'RIA (*husterikos:* from *hustera*, the womb: *Gr.*—because the disease is supposed to be connected with it), in Medicine, a malady that attacks in paroxysms or fits, which are readily excited in those who are subject to them, by passions of the mind, and by every considerable emotion, especially when brought on by surprise: hence, sudden joy, grief, fear, &c, are very likely to occasion them.

HYS'TERON PROT'ERON or HUS'TERON PROT'ERON, two Greek words, meaning *the last first:* hence it is used, in rhetoric, to designate the figure in which that word which should follow is used first: as, *Valet atque vivit* (he is well and lives).

I

I, the ninth letter in the alphabet, and the third vowel. Its sound varies; in some words it is long, as *high*, *mind*, *pine*; in some it is short, as *bid*, *kid*; and in others it is pronounced like *y*, as *collier*, *onion*, &c. In a few words its sound approaches to the *ee* in *beef*, as in *machine*, which is the sound of the long *i* in all European languages except the English. When two *i*'s came together, the Latins contracted them into one; as *Dii* into *Di*. In all Latin words of Latin origin, *i* preceding a vowel (unless it follows another vowel) is a consonant, as *Ianus* (*Janus*), *conicio* (*conjicio*); but in words of Greek origin it is a vowel, as *iambus*, *iaspis*. No English word ends with *i*, but when the sound of the letter occurs at the end of a word, it is expressed by *y*. It is sometimes used as an abbreviation, as E I.C *East India Company*, I H.S. *Jesus Hominum Salvator* (Jesus the Saviour of men), &c. I, used as a numeral, signifies no more than one, and it stands for as many units as there are repetitions of it: thus, II stands for 2, III for 3. When put before a higher numeral, it is to be subtracted from the latter: as IV, 4. And when set after it it is to be added to it: as XII, 12.

IAM'BIC or **IAM'BUS** (*iambos*: *Gr.*), in Poetry, a foot consisting of two syllables, the first short and the last long, as in *declare*, *adorn*. Verses composed of short and long syllables alternately are termed *iambics*; as,

If ty- | rant fac- | tion dare | assail | her throne,
A peo- | ple's love | shall make | her cause | their own.

I'BEX (a wild goat: *Lat.*), or *Steinbock*, the *Capra Ibex* of zoologists, a species of goat. It has extremely long horns, which bend backwards, are of a blackish colour, and annulated on the surface. The body is of a dusky yellowish brown colour, and is less in proportion to the height than that of the common goat; it has, indeed, a great resemblance to the deer kind; the legs are also perfectly like those of the deer, straight, elegant and slender. The hair is harsh, and the male is furnished with a black beard. These animals inhabit the chain of mountains extending from Mount Taurus, between Eastern Tartary and Siberia; they are also to be met with in the most precipitous and inaccessible parts of the Alps, the Pyrenees, and the Carpathians. They are remarkably swift, and display amazing dexterity and agility in leaping; so that the ibex hunter is constantly in imminent peril, from the fear of losing his footing when scaling tremendous precipices, and from the animal when closely pursued turning suddenly on his enemy. Their cry is a sharp short whistle, not unlike that of the chamois, but of shorter duration; sometimes, especially when irritated, they make a snorting noise.——The name has been given also to a species of antelope.

I'BIS (*Gr.*), in Ornithology, a genus of birds, closely resembling the storks, and found chiefly in warm climates, more particularly in Egypt. The bill is long and curved, the legs are long, and the feet have four toes, the front webbed at the base, and all provided with claws. These birds are capable of a powerful and elevated flight, extending their neck and legs, and uttering a hoarse croak. The white ibis (*Ibis æthiopica*) arrives in Egypt about the time that the inundation of the Nile commences, and migrates about the end of June, at which period it is first noticed in Ethiopia. The scarlet ibis (*Ibis rubra*), a splendid bird, is found in the hottest parts of America, in large flocks; the plumage is scarlet; beak naked; part of the cheeks, legs, and feet, pale red. Other species are found in India, Madagascar, the Cape of Good Hope, and Mexico. One species, the glossy ibis, has been occasionally killed in England. The ibis was venerated by the ancient Egyptians; and ibis mummies have been found in great numbers in Egypt.

ICE (*eis*: *Ger.*), water congealed. If water is exposed to a temperature below 32° Fahr. it assumes a solid state by shooting into crystals which cross each other at angles of 60 degrees. It is lighter than water, on which, therefore, it floats; and its increase of dimensions is acquired with a force sufficient to burst the strongest vessels. [See FREEZING, &c.]

ICE'BERGS (*eis*, ice; and *berg*, a mountain: *Ger.*), masses of ice carried by the winds through the polar seas. They are often of enormous size and height, rising 300 or 400 feet above the water, and sinking four or five times as much below it. Within the arctic circle, the congelation begins about the 1st of August; and a sheet of ice, perhaps an inch in thickness, is formed in a single night. In a short time, the whole extent of the polar seas is covered with a mass several feet thick. As soon as the summer heat commences, it is partially melted, and, with the first swell of the ocean, breaks up.——*Floating Ice.* There are numerous terms for this. A large flat mass extending beyond the reach of sight is called *field-ice*; one of smaller dimensions a *floe*; when a field is much broken up, it is called a *pack*. If a ship can sail freely through the floating pieces of ice, it is called *drift-ice*. A portion of ice rising above the common level is called a *hummock*, being produced by the crowding of one piece over another.

I'CE-BLINK (*blinken*, to glitter: *Ger.*), a name given by seamen to a whitish appearance in the horizon: occasioned by fields of ice, which reflect the light obliquely against the atmosphere.

I'CE-HOUSE, a building contrived to pro serve ice in hot weather; the ice is rammed as close as possible, and at the bottom is a well to drain off the water from any part that melts.

I'CELAND MOSS, *Lichen Islandicus*, *Cetraria Islandica*, a lichen common in the mountainous districts of Europe. It contains a bitter principle, and a large quantity of starch. It is tonic and nutritive

I'CELAND SPAR, in Mineralogy, carbonate of lime forming crystals of the rhombohedral system. It occurs in laminated masses, easily divisible into rhombs. It is highly useful in experiments on double refraction and the polarization of light.

I'CE-MAKING MACHI'NES. The demand for ice both as a luxury in hot weather, and as a remedial agent in many diseases, has led to the invention of several machines for its manufacture on a large scale The principal contrivances that have had a successful result are the following:—1 *Ether Machines*, in which the evaporation of sulphuric ether causes a low degree of cold in a quantity of common brine, and in this brine troughs containing the water to be frozen are immersed. A steam-engine is employed to drive an air-pump which exhausts the vapour from the liquid ether, and also to cause the circulation of the brine surrounding the vessel containing the ether and the troughs with the water to be frozen The ether vapour is liquefied after the operation of cooling the brine has been effected, and is then again ready to perform the same operation. 2. Machines in which *ammoniacal gas*, which has a strong affinity for water, but is easily separated from it by the application of heat so employed. A saturated solution of ammonia is placed in a strong vessel which communicates with another vessel of one-fourth the size by a tube, all being filled with ammoniacal gas. The vessel containing the solution being heated, the gas is driven off from it, and liquefied ammoniacal gas will form in the smaller vessel by reason of the increased tension. Now if the process be reversed, and the vessel containing the liquefied gas be placed in contact with a third vessel containing the water to be frozen, whilst the larger vessel with the watery solution is cooled, the liquid gas will vaporize and rush from the smaller to the larger vessel, to unite once more with the water. The rapid evaporation causes a degree of cold sufficient to freeze the water in the third vessel. When this has been done the process may be repeated again and again, each time freezing another supply of water conveniently placed in the third vessel A steam-engine is here also employed to work the apparatus, when of a large size. 3. *Air Machines*, of which the effect depends upon the alternate condensation and expansion of common air. When air is compressed, its heat is squeezed out of it, and when it is again allowed to expand it absorbs heat from the surrounding medium, and hence causes that medium to fall considerably in temperature. This is the principle of Kirk's machine, which is capable of producing cold sufficient to freeze water for economical purposes.

ICE PLANT, the *Mesembryanthemum crystallinum*, a plant remarkable for the little transparent vesicles which cover its whole surface. The stems are herbaceous and much ramified, and the flowers are white. It is a native of the Cape of Good Hope.

ICH DIEN (*Ger.*), the motto of the Prince of Wales's arms, signifying *I serve*. It was first used by Edward the Black Prince, to show his subjection to his father king Edward III.

ICHNEU'MON (*ichneumōn*, from *ichneuo*, I trace out: *Gr.*), the name of animals belonging to the genus *Herpestes*. They are allied to the civets amongst the *Felidæ* The best known species is the *H. ichneumon*. Its ordinary colour is a chestnut brown; the tail tapers to a point, and the toes are distant from each other. The habits of the ichneumon are very similar to those of the ferret; like that animal, it preys upon poultry, rats, &c.; but it also destroys the most venomous serpents, and seeks the eggs of the crocodile, digging them out of the sand, and eating them with the greatest avidity. In India and Egypt it is domesticated for the purpose of destroying rats and mice The ichneumon of the Nile was one of the sacred animals of the Egyptians.——ICHNEUMON, a genus of hymenopterous insects belonging to a large family the species of which have been denominated parasitical, on account of the very extraordinary manner in which they provide for the future support of their offspring. The fly feeds on the honey of flowers, and, when about to lay eggs, perforates the body of some other insect, or its larvæ, with the sting or instrument at the end of its abdomen, and there deposits them. These eggs in a few days are hatched, and the young nourish themselves with the juices of their foster-parent, which, however, continues to move about and feed till near the time of its change to a chrysalis, when the larvæ of the ichneumon creep out by perforating the skin in various places, and each, spinning itself up in a small oval silken case, changes into a chrysalis, and after a certain period emerges in the state of a complete ichneumon It is as great destroyer of caterpillars, plant-lice, and other insects, as the *Herpestes* is of the eggs and young of the crocodile.

ICHNITES (*ichnos*, a track: *Gr.*), in Geology, the fossil footsteps and tracks of animals, originally made on the sand, or mud of an ancient seashore, or lake margin. They are frequently found in quarries, one slab showing the impressions themselves, and an upper slab a cast of them in relief.

ICHNOG'RAPHY (*ichnographia*: from *ichnos*, a trace; and *grapho*, I draw: *Gr.*), in Architecture, the ground-plan of a building.——In Fortification, a draft of the length and breadth of the works raised about a place.——In Perspective, the view of anything cut off by a plane parallel to the horizon, just at the base of it.

ICHNOL'OGY, a treatise on ichnites.

I'CHOR (*ichōr*: *Gr.*), a thin watery humour, like serum; but the word is sometimes used likewise for a thicker kind, flowing from ulcers, called also *sanies*. The term was applied by the Greeks to the fluid which issued from the wounds of the gods.

ICHTHYI'TES (*ichthus*, a fish: *Gr.*), or ICHTHYOLITES, in Geology, the fossil remains of fishes

ICHTHYOCOL'LA (*ichthuokolla:* from *ichthus*, a fish; and *kolla*, glue: *Gr.*), *Isinglass*, which see.

ICHTHYOL'OGY (*ichthus*, a fish; and *logos*, a discourse: *Gr.*), that part of zoology which treats of fishes, their structure, form, and classification, their habits, uses, &c. Fishes form a distinct class of the vertebrate sub-kingdom. They are cold-blooded aquatic animals, and their red blood is aerated by means of gills. The heart has onlyone auricle and one ventricle. The sexes are distinct, and the young are produced from eggs. These eggs form what is called *roe*, whilst the *milt* is the male fecundating matter which is brought into contact with the eggs after they have been ejected by the female fish. Fishes are remarkable for their fecundity. A cod fish has been found to produce 3,686,000 eggs or spawn; and a ling, 19,248,000. Herrings, weighing from four ounces to five and three-quarters, from 21,000 to 37,000. Mackerel, weighing twenty ounces, 454,000. Soles of five ounces, 38,000 Many fishes possess an internal bladder filled with air, called the swim-bladder, and this is thought to be instrumental in aiding a fish to rise from a great depth to the surface. The skin is sometimes naked, but usually it is clothed with either *Cycloid* or *Ctenoid* scales. Sometimes the fish is protected by *Ganoid*, or *Placoid* plates. When a fish has the full complement of fins, it has one or more dorsal fins, one or more anal fins, two pectoral fins, two ventral fins, and a caudal fin. In some genera, some of these fins are wanting, and occasionally a fish has no fins whatever. The tail and its fin are the principal agents in locomotion, the other fins serving more to balance and steer by than to drive onwards. In some fishes not only do the jaws carry teeth, but every bone inside the mouth is similarly armed. In other fishes there is not a single tooth in the mouth. Some fishes are vegetable feeders, but the majority are carnivorous, it being their lot to eat or be eaten. A fish's head is a complicated structure, and its investigation has often employed naturalists, the object in view being to find what each bone corresponds with, in the heads of other classes of vertebrata. The class has been divided into ten orders, as set forth in the following table:—

Order 1. *Dermopteri*, boneless fishes, including the Lampreys and other genera

Order 2 *Malacopterygianæ*, fishes without spines in the fins; including Eels, Herrings, the Salmon, and Carp families, &c.

Order 3. *Pharyngognathi*, fishes whose lower pharyngeal bones are united; including the Flying-fishes, the Wrasses, &c.

Order 4. *Anacanthini*, including the Cod family, the Turbot family, the Remoras, &c.

Order 5. *Acanthopterygianæ*, fishes with spines in some of the fins, including the Perch, Mullet, Mackerel, Gurnard and many other families.

Order 6. *Plectognathi*, the parts of the upper jaw fixed together, and united to the skull by a suture, including the Globe fishes, the File fishes, &c.

Order 7. *Lophobranchii*, fishes whose gills are in tufts, including the Pipe fishes, the Seahorse, &c.

Order 8. *Ganoidei*, the body covered with hard plates, including the Sturgeon, &c.

Order 9. *Holocephali*, the body covered with placoid granules, including the Chimæras.

Order 10. *Plagiostomi*, fishes with cartilaginous skeletons, and five or more gill openings on each side, including the Sharks and Rays

ICHTHYOSAURUS (*ichthus*, a fish; *saura*, a lizard: *Gr.*), a genus of extinct aquatic reptiles, the remains of which have been found in the trias, the lias, and the lower chalk. Several species have been made out, all carnivorous. One species was more than 30 feet long. In the same individual (says Dr Buckland) the snout of a porpoise was combined with the teeth of a crocodile, the head of a lizard with the vertebræ of a fish, and the sternum of an *Ornithorhynchus* with the paddles of a whale. The general outline of an Ichthyosaurus must have most nearly resembled the modern porpoise and grampus. It had four broad feet or paddles and terminated behind in a long and powerful tail. The dung of these animals has been found fossilized and has received the name of coprolites. The marks upon it have enabled conclusions to be drawn as to the form of the intestinal canal.

ICHTHYO'SIS (*ichthus*, a fish: *Gr.*), in Medicine, a scaly eruption of the skin to which the inhabitants of islands near the equator are subject. It is ascribed to an unsuitable diet

I'CONISM (*eikonismos*, a delineation: *Gr.*), in Rhetoric, a figure of speech which consists in representing a thing to the life.

ICON'OCLASTS (*eikōn*, an image, and *klao*, I break in pieces: *Gr.*), an appellation given to the Constantinopolitan emperors, Leo the Isaurian, and his son Constantine Copronymus, who overthrew images, and extirpated their worship in Christian churches: also to the 338 bishops who attended a council at Constantinople, during the reign of the latter prince, and advocated the same views. The council of Nicæa, in 787, however, restored their use; it was the last council respecting which the Greek and Latin churches coincide. The Greek church allows pictures, but studiously rejects graven images.

ICONOG'RAPHY (*eikonographia:* from *eikōn*, an image; and *grapho*, I describe: *Gr.*), the description of images or ancient statues, busts, semi-busts, paintings in fresco, mosaic works, &c.

ICOSAHE'DRON (*eikosi*, twenty; and *hedra*, a base: *Gr.*), in Geometry, one of the five regular or Platonic bodies, bounded by twenty equilateral and equal triangles. It may be considered as formed by twenty equal and similar triangular pyramids, whose vertices meet in the same point, which is the centre of a circumscribing sphere.

ICTERUS (*ikteros*: *Gr.*, from resembling in colour a bird of that name), in Medicine, the disease which we distinguish by the name of *jaundice*.

IDE'A (*Gr.*, from *idein*, to see). Locke defined ideas to be whatever is the object of the understanding, whatever a man thinks, or whatever it is the mind can be employed about thinking. Plato used the word ideas to signify the archetypes and essences of things, objects that are now generally thought to be beyond the reach of the human intellect. In Kant's system ideas were the forms of the reason's activity, and are independent of experience.

IDE'AL, an imaginary model of perfection.——**Beau Ideal** (ideal beauty), an expression in the Fine Arts, denoting the selection, for a particular object, of the finest parts, from different subjects, so as to form a perfect whole, such as nature does not usually exhibit. It more particularly applies to sculpture and painting.

IDE'ALISM (*idea*, form: *Gr.*), schemes of philosophy which teach that we are concerned only with ideas, and are ignorant of everything else. Bishop Berkeley argued that what our senses convey to us is, not evidence of an external world, but only of our sensations. Further, that we are utterly ignorant, and must ever remain so, of matter itself, and that it is easier to conceive that God directly causes our sensations than that they are conveyed to us through the unknown world of matter.

IDEOGRAPH'IC (*idea*, an idea; and *grapho*, I write: *Gr.*), an epithet given to that kind of writing which expresses the ideas and not the sound. The Chinese characters are ideographic, though the symbols have become merely conventional. Such also were the hieroglyphics of the ancient Egyptians.

IDES (*idus*, supposed to be from the old Etruscan verb *iduo*, I divide: *Lat.*), eight days in each month of the Roman calendar. They began on the 15th of March, May, July, and October; and on the 13th of the other months. The Ides, like the calends and nones, were always reckoned backwards; thus they said viii. Idus, the eighth day before the Ides, vii. Idus, the seventh before the Ides, &c. This method of reckoning is still retained in the chancery of Rome, and in the calendar of the breviary.

ID'IOM (*idios*, peculiar: *Gr.*), in Grammar, a term applied to such phrases as are peculiar to a language, and which, if transferred into another, would have no meaning, or a wholly different one. Idioms can never be literally translated.

IDIOPATH'IC (*idos*, peculiar; and *pathos*, a feeling, *Gr.*), an epithet for any disorder peculiar to a certain part of the body, and not arising from a preceding disease: in which sense it is opposed to *sympathetic*. Thus, an epilepsy is *idiopathic*, when it happens merely through some morbid state of the brain: and *sympathetic*, when it is the consequence of some other disorder.

IDIOSYN'CRASY (*idiosunkrasia*: from *idios*, peculiar; *sun*, with; and *krasis*, a temperament: *Gr.*), a peculiar temperament or organizaton of the body, by which it is rendered more liable to certain disorders than bodies differently constituted usually are.

ID'IOT (*idiōtēs*, an inexperienced person: *Gr.*), in Law, one who has been born totally without understanding. A *lunatic* is one who has lost it by sickness, grief, &c., so as to have no lucid intervals. Commissions are issued upon petition, by the lord-chancellor, to determine whether or not a party be under such imbecility as to require protection in the management of his affairs.

I'DOCRASE (*idea*, form; and *krasis*, mixture: *Gr.*), because a mixture of the forms of other minerals, the *volcanic garnet*, sometimes called volcanic chrysolite or hyacinth. It is found in the ejected masses of Vesuvius and elsewhere, and is of various colours. It is an alumino-silicate of lime, with about one-twentieth oxide of iron.

IDOL'ATRY (*eidōlolatreia*: from *eidōlon*, an image; and *latreia*, service: *Gr.*), in its literal acceptation, denotes the worship paid to idols.

I'DYL (*eidullion*, a *dim.* of *eidos*, form: *Gr.*), a short pastoral poem, exemplified by the Idyls of Theocritus and Gesner.

IGNES'CENT (*ignesco*, I kindle: *Lat.*), in Mineralogy, an epithet applied to a stone or mineral which gives out sparks when struck with steel or iron.

IG'NIS FAT'UUS (vain fire: *Lat.*), a meteor or light that appears in the night over marshy grounds. It is occasioned by an ascent from the earth of phosphuretted hydrogen gas, derived from animal and vegetable remains, and igniting of itself in the air. It is vulgarly called *Will-o'-the wisp*, or *Jack-o'-lantern*.

IG'NIS JUDI'CIUM (the judgment of fire: *Lat.*), in Archæology, the old judicial trial by fire.

IG'NIS SA'CER (holy fire: *Lat.*), in Medicine, the disease vulgarly known by the name of *St. Anthony's fire*.

IGNI'TION (*ignis*, fire: *Lat.*), the act of taking fire; *combustion* is a consequence of ignition. Iron, when red-hot, is ignited; but when plunged into oxygen it undergoes combustion. *Spontaneous ignition* is that which takes place of itself.

IGNORA'MUS (*Lat.*), in Law, the term used by the grand jury when they *ignore* or throw out a bill of indictment. It means, 'We know nothing about it, or have not sufficient evidence respecting it.'

IGUA'NA (*Ind.*), in Zoology, a genus of reptiles, found in the tropical parts of America. They are characterized by a body and long round tail covered with imbricated scales, five toes on each foot, a dewlap under the throat, and a toothed ridge along the back. They feed on fruits, seeds, and leaves. The female deposits her eggs, which are about the size of a pigeon's, in the sand. Some species attain a great size, and are very active; but although formidable in appearance, they are all timid and defenceless.

IGUAN'ODON (*iguana;* and *odous*, a tooth: *Gr.*), an extinct herbivorous reptile of enormous dimensions, the fossil remains of which have been found in the Wealden beds. Its chief distinctive character is the form of the teeth, which have serrated edges, like those of the iguana. From the proportions which the bones of the iguanodon bear to the iguana, this monster of a former world must have been 70 feet from the snout to the tail; and the latter alone must have been 52½ feet in length. The circumference of the body was about 14½ feet, and the snout was armed with a short but strong horn; but its tail must have been its most effective weapon.

IL'EUM (*ilia*, the bowels: *Lat.*), the last portion of the small intestine, terminating at the valve of the cæcum.

I'LEX (*Lat.*), in Botany, a genus of evergreen shrubs, nat. ord. *Aquifoliaceæ*, including the holy.

IL'IAC PAS'SION (*ilia*, the bowels: *Lat.*), a sort of nervous colic, in which bilious and fæcal matter is voided by the mouth, on account of obstructions in the intestinal canal.

IL'IAD (*Ilias*, from *Ilion*, Troy: *Gr.*), the oldest epic poem in existence; generally attributed to Homer. It is in Greek hexameter verse, and is divided into 24 books. Its theme is 'the wrath of Achilles, which brought countless woes upon the Greeks, and hurled many valiant souls down to Hades' at the siege of Troy, when that warrior had quarrelled with Agamemnon, the leader of the Greeks. The siege proceeds, but Achilles withdraws himself; the gods take different sides and assist in the fight; single combats are related between Paris and Menelaus, and Hector and Ajax. Many engagements take place without decisive results. In one of them, Patroclus the friend of Achilles is slain, and this enrages Achilles so much that he returns to the fight, having obtained a new suit of armour and a splendid shield from Vulcan. Hector is slain by Achilles, and the body is dragged along the ground behind the victor's chariot. Priam, his father, however, ransoms the body, the funeral obsequies are duly performed, and so the poem ends. One of the most beautiful passages in this celebrated poem is that which relates the parting of Hector and his wife Andromache. The Iliad is so wanting in continuity, and contains so many inconsistent passages, that it is thought to be the work of several persons. Writers differ as to the date of its composition, but it may be most probably assigned to the 900th century B.C. [See ODYSSEY.]

IL'IUM OS (the bone of the entrails: *Lat.*), in Anatomy, the *haunch-bone.*

IL'LATIVE CONVER'SION (*illatus*, inferred: *Lat.*), in Logic, that in which the truth of the converse follows from the truth of the proposition given. Thus, from the fact that no honourable man is a liar, it follows that no liar is an honourable man.

ILLI'CIUM (*illicio*, I allure: *Lat.*; it is an enticing plant on account of its smell), a genus of evergreen shrub, nat. ord *Winteraceæ.* The species are natives of Japan and Florida.

ILLUMINA'TI (the enlightened: *Lat.*), a secret society formed in Bavaria in 1776. Its professed object was the attainment of a higher degree of virtue and morality than was found in ordinary society. It was suppressed by the Bavarian government in 1784. By some writers, the *Illuminati* are said to have had a powerful influence in promoting the French revolution; and by others the assertion is absolutely denied. ——Among the early Christians, the term *Illuminati* was given to persons who had received baptism; in which ceremony a lighted taper was given to them, as a symbol of the faith and grace they had obtained by that sacrament.

ILLU'MINATING (*illumino*, I make splendid: *Lat.*), the art of laying colours on initial capitals in books, or otherwise embellishing manuscripts, after the manner of the artists formerly called *Illuminators.* Manuscripts, containing portraits, pictures, and emblematic figures, form a valuable part of the riches preserved in the principal libraries in Europe.

IM'AGE (*imago: Lat.*), in Optics, the appearance or picture of an object, formed either by reflection or refraction. With a convex lens, the image is as much less than the object as the square of the distance of the lens from the object is greater than the square of the distance of the lens from the image. In *plane* mirrors, the image is of the same magnitude as the object, and appears as far behind the mirror as the object is before it. In *convex* mirrors, the image is less than the object. In *concave* mirrors, the image is larger or smaller than the object, according as the latter is in that conjugate focus, which is nearer to or further from the mirror. The brightness of an image is proportional to the apparent magnitude of the mirror or lens, as seen from the object, multiplied by the area of the object, and divided by the area of the image. Hence, when, as with the magic lantern, the image is larger than the object, the latter must be strongly illuminated. When the object and its image are only physical points, as in the case of the stars, the brightness of the image is proportional to the magnitude of the lens, or the square of the diameter of the aperture of the telescope. Hence stars, invisible with small telescopes, are rendered visible by larger.—— IMAGE, in Rhetoric, a lively description of anything, in a discourse, which presents a kind of picture to the mind.——IMAGE, in a religious sense, an artificial representation of some person or thing, used either by way of decoration and ornament, or as an object of religious worship and veneration.

IMAG'INARY QUAN'TITIES or **SURDS**, in Algebra, the even roots of negative quantities, being the imaginary results of some impossible operation. Thus, $\sqrt{-x^2}$ is an impossible quantity, since no quantity multiplied by itself can produce $-x^2$.

IMAGINA'TION (*imaginatio: Lat.*), in Metaphysics, that action of the mind by which it combines ideas, and 'bodies forth the forms and images of things.' In many philosophical disquisitions, *imagination* is used almost synonymously with *fancy*. But the object of the latter seems to be to furnish materials which may be used by the former.

IMAGO (*image: Lat.*), in Entomology, the typical or perfect form of a species of insect after undergoing metamorphosis.

IM'AM or IM'AN, an inferior order of ministers of religion in the Turkish empire. The chief imam of each mosque assists at circumcisions, marriages, burials, &c., and presides over the assembly of the faithful: the solemn noon prayer on Friday being superintended by the khatib. The legitimate successor of Mahomet, in whom theoretically the temporal and ecclesiastical government of Islam should reside, is termed *Imam* by pre-eminence; but the Turks are not agreed as to what precisely this dignity is, or who bears it.

IM'BRICATE or IM'BRICATED (*imbricatus*, laid one upon another like tiles: *Lat.*), in Botany, lying one over another, like tiles on a roof; thus, the scales on the cups of some acorns.

IMMER'SION (*immersio*, from *immergo*, I plunge into: *Lat.*), in Astronomy, the disappearance of any celestial object behind another, or its shadow. Thus, in an eclipse of one of Jupiter's satellites, the immersion occurs when the satellite disappears behind the body of the planet, or enters its shadow. The reappearance of the body is called its *emersion*. The immersions and emersions of fixed stars, occulted by the moon, are highly important for the correction of lunar tables.——*Baptism by immersion* seems to have been the most ancient method of administering that sacrament; a triple immersion being used, at least after some time, in honour of the Trinity.

IMMOLA'TION (*immolatio*, a sacrificing: *Lat.*), a ceremony used in the Roman sacrifices; it consisted in throwing upon the head of the victim some sort of corn and frankincense, together with the *mola*, or salt cake, and a little wine.

IM'PACT (*impingo*, I dash against anything: *Lat.*), in Mechanics, the simple or single action of one body upon another. The *point of impact* is the point or place where the body acts.

IMPA'LEMENT, in Heraldry, the division of a shield palewise, when it is said to be *party per pale*. *Impalement per baron et feme* is the division which takes place on marriage, the husband's coat being borne on the dexter side, and the wife's on the sinister.——IMPALEMENT, a species of punishment used by some barbarous nations, and consisting in a stake being thrust up through the body, and the victim being left to die a lingering death.

IMPARISYLLAB'IC (*impar*, unequal; and *syllaba*, a syllable: *Lat.*), in Grammar, an epithet for words not having the same number of syllables.

IMPAR'LANCE (*parler*, to speak: *Fr.*), an old law term for a privilege or license granted, on petitioning the court for time to consider what answer the defendant should make to the plaintiff's declaration.

IMPASTA'TION (*Fr.*, from *pâte*, paste), the baking or binding together with some cement, and the hardening by air or fire, a mixture of various materials of different colours and consistencies, so as to form them into a paste of some kind.

IMPASTO (*Ital.*), a term used by artists with reference to the degree of thickness with which the colours in an oil painting are laid on. In some pictures the *impasto* is so thin that the threads of the canvas may be counted; in others, those of Rembrandt for instance, it is so thick that the paint stands up in lumps.

IMPA'TIENS (*impatient: Lat.*), the name given by Linnæus to the botanical genus which includes the well-known balsams, on account of the elastic force with which the valves of the fruit separate on being touched when near maturity.

IMPEACH'MENT (*empêchement: Fr.*), in Law, the accusation brought against a public officer in parliament, for treason or other crimes and misdemeanors. An impeachment by the House of Commons is of the nature of a presentment to the House of Lords, the supreme court of criminal jurisdiction. The articles of impeachment, found by the Commons, are the same as a bill of indictment, which is to be tried by the Lords.

IMPENETRABIL'ITY (*impenetrabilis*, that cannot be penetrated: *Lat.*), in Philosophy, that quality of matter which prevents two bodies from occupying the same space at the same time.

IMPER'ATIVE (*imperativus*, proceeding from a command: *Lat.*), in Grammar, one of the moods of a verb, used when we would command, exhort, or advise.

IMPERA'TOR (commander: *Lat.*), in Roman Antiquity, a title of honour conferred on victorious generals by their armies, and confirmed by the senate. After the overthrow of the republic, *imperator* became the highest title of the supreme ruler; and, in later times, it had the signification which we attach to the word *emperor*.

IMPER'FECT (*imperfectus*, unfinished: *Lat.*), a tense in grammar, denoting a modification of a verb, which expresses that the action or event of which we speak was, at the time to which we refer, in an unfinished state. In English, it is designated by *was*, with the present participle.

IMPER'SONAL VERB (*impersonalis: Lat.*), in Grammar, a verb used only in the third person singular, with *it* for a nominative in English; as *it rains*. Impersonal verbs, in every language, must refer to some noun; and therefore must, in reality, have some nominative case.

IMPETI'GO (*Lat.*), in Medicine, an eruption of small pustules, sometimes called the *moist-tetter*. Certain trades, in which irritating substances are brought in contact with the skin, often produce it. Cleanliness is a great preventive of it.

IMPETRA'TION (*impetratio*, an obtaining by request: *Lat.*), the obtaining anything by request or prayer; but in our old statutes, it is taken for the pre-obtaining from the court of Rome, of church benefices in this realm, the disposal of which belonged to the king and other lay patrons.

IM'PETUS (*Lat.*), in Mechanics, the force with which one body impels or strikes another.

IM'PORTS AND EX'PORTS (*importo*, I carry into; and *exporto*, I carry away: *Lat.*). Under these appellations are comprised the various commodities brought into this country from abroad; and those home manufactures and products which, through our commercial relations, we sell or barter, and send to other countries.

IMPO'SE (*imposer*, to impose: *Fr.*), in Printing, to put the pages on the *imposing stone*, and fit on the chase, so as to prepare the *form* for the press.

IMPOSI'TION OF HANDS (*impositio*, a laying on: *Lat.*), a religious ceremony in which the bishop lays his hands upon the head of a person, in ordination, confirmation, or in the uttering a blessing. This practice is also generally observed by dissenters at the ordination of their ministers, while a blessing is invoked on the labours of him they are ordaining. Imposition of hands was a Jewish ceremony, introduced not by any divine authority, but by custom; their practice being, whenever they prayed for any person, to lay their hands on his head.

IMPOS'SIBLE (*impossibilis: Lat.*). A thing is said to be *physically impossible*, if it cannot be done by any natural powers, as the resurrection of the dead; and *morally impossible*, if in its own nature it is possible, but is attended with difficulties or circumstances which give it the appearance of being impossible:—*morally impossible* is the same as *extremely improbable*.

IM'POST (*impositus*, laid on: *Lat.*), any tax or tribute imposed by authority, particularly a duty or tax laid by government on goods imported.——In Architecture, that part of a pillar, pier, or pilaster, which receives an arch; and generally any supporting piece.

IMPOS'THUME, in Surgery, an abscess, or gathering of corrupt matter, in any part of the body.

IMPREGNA'TION (applied to animals and plants), the act of fecundating and making fruitful. In Botany, a deposit of the fecundating dust or pollen of the stamens on the pistils of a plant.

IMPRESCRIP'TIBLE RIGHTS (*in*, not; and *præscribo*, I object to: *Lat.*), such rights as a man may use or not at pleasure; those which cannot be lost to him by those claims of another which are founded on prescription.

IMPRES'SION (*impressio: Lat.*), in the Arts, is used to signify the transfer of engravings from a hard to a soft substance, whether by means of the press, as in copper-plate and lithographic printing, or by means of wax, &c., as with copies obtained from medals and engraved gems. The word is used also to denote a single edition of a book.

IMPRIMA'TUR (let it be printed: *Lat.*), the word by which the licenser allows a book to be printed, in countries where the censorship of books is rigorously exercised. The formular is still used in some of our universities, particularly those of Scotland.

IMPRI'MIS (*Lat.*), in the first place; first in order.

IMPROMP'TU (*Fr.*), in Literature, a short and pointed production, supposed to be brought forth without premeditation.

IMPROPRIA'TION (*in*, to; and *proprius*, one's own: *Lat.*), in Law, the ownership of tithes, glebe or other ecclesiastical dues, by a layman. The term *appropriation* is generally used if they are in the hands of ecclesiastical persons. When the religious societies were dissolved at the reformation, the lands, &c., belonging to many benefices which had been in their hands were given to the king, who granted them to lay impropriators.

IMPROVVISATO'RI (*Ital*; from *improviso*, unpremeditatedly: *Lat.*), those who compose and recite verses extemporaneously, either accompanying the voice, or not, with an instrument; as is the practice in Italy. A talent for the extemporaneous recitation of verses seems almost a peculiar characteristic of the Italians. It is no uncommon thing to see two masks that happen to meet during the carnival challenging each other in verse, and answering stanza for stanza with genuine humour and poetic feeling. The talent of an improvvisatore (says Sismondi) is the gift of nature, and a talent which has frequently no relation to the other faculties. When it is manifested in a child it is studiously cultivated, and he receives all the instruction which seems likely to be useful to him in his art. The improvvisatore generally begs from the audience a subject for his verse. The topics usually presented to him are drawn from mythology, religion, history, or some passing event of the day. After having been informed of the subject, he remains a moment in meditation, to view it in its various lights, and to shape out the plan of the little poem which he is about to compose. He then prepares the eight first verses, that his mind during the recitation of them may receive the proper impulse In about seven or eight minutes he is fully prepared, and commences his poem, which often consists of 500 or 600 verses. His eyes wander around him, his features glow, and he struggles with the prophetic spirit which seems to animate him.

INA'LIENABLE (*in*, not: and *alienabilis*, capable of being transferred: *Lat.*), an epithet applied to such things as cannot be legally alienated or made over to another: thus, the dominions of a sovereign, the revenues of the church, the estates of a minor, &c. are *inalienable*, otherwise than with a reserve of the right of redemption.

INAUGURA'TION (*inauguratio*, a beginning: *Lat.*, literally the taking of omens: a practice observed by the Romans at the commencement of every important enterprise), the act of inducting into office with solemnity; as the coronation of an emperor or king, or the consecration of a prelate.

IN'CA, the name or title given by the natives of Peru to their king and to the princes of the blood, before the conquest of that country by the Spaniards.

INCANDES'CENCE (*incandesco*, I grow hot: *Lat.*), the glowing whiteness of a metallic or other body, caused by intense heat.

INCARNA'TION (*in*; and *caro*, flesh: *Lat.*), in Surgery, the process of healing wounds, and replacing morbid with new flesh.

IN'CENSE (*encens*; *Fr.*) [See FRANKINCENSE.] The burning of incense made part of the daily service of the Jewish temple; and in the Roman Catholic church it is the deacon's office to incense the officiating priest or prelate and the choir. In the religious rites of heathen nations, too, spices and fragrant gums were burnt as incense. ——INCENSED, in Heraldry, an epithet for panthers when represented with fire issuing from their mouths and ears.

INCEP'TIVE MAG'NITUDE (*incipio*, I begin: *Lat.*), a first principle having no magnitude itself, but capable of producing it by being enlarged; thus, a *point*.——In Grammar, an *inceptive*, or *inchoative verb*, indicates a commencement of increase in the qualities indicated by the original verb. Thus, *augeo* means 'I increase;' but *augesco*, 'I *begin* to increase.'

IN'CIDENCE, ANGLE OF (*incido*, I fall upon: *Lat.*), the angle formed by a straight line which cuts any other line or surface with the perpendicular to that line or surface drawn through the point of intersection. —— In Optics, when rays of light striking a body are reflected, the angle of incidence and the angle of reflection are equal.

IN'CIDENT (*incidens*, happening: *Lat.*), in Law, something that inseparably belongs to another termed the *principal*: thus, a court baron is incident to a manor.

INCINERA'TION (*in*, into; and *cinis*, ashes: *Lat.*), in Chemistry, the combustion of organic substances, for the purpose of obtaining their incombustible residue.

INCI'SORS (*incido*, I cut through: *Lat.*), the name given to the front teeth in the jaws of vertebrate animals, because they cut the food.

INCLINA'TION (*inclinatio*: *Lat.*), a word frequently used in Geometry and Natural Philosophy, and signifying the mutual approach, tendency, or leaning of two lines or two planes towards each other, so as to make an angle.——INCLINATION of a right line to a plane, the acute angle which that line makes with another right line drawn in the plane through the point where the inclined line intersects it, and through the point where it is also cut by a perpendicular to the plane let down from any point of the inclined line.——INCLINATION of the axis of the earth, the angle which it makes with the axis of the ecliptic, or the angle contained between the planes of the equator and the ecliptic, viz. 23° 28′. *Inclination of the lunar orbit* to the ecliptic, 5° 8′ 48″.——INCLINATION in terrestrial magnetism is the angle which the magnetic needle makes with the plane of the horizon. The dip, as it is frequently termed, varies from the magnetic equator, where it is *nil*, to the magnetic pole, where the needle is at right angles to the plane of the horizon. Lines drawn through points on the earth's surface, where the angles of dip are equal, are termed isoclinal lines.

INCLI'NED PLANE (*inclino*, I incline: *Lat.*), in Mechanics, one of the six mechanical powers, and one of the two to which all are reducible—a plane inclined to the horizon, or making an angle with it. The wedge is a modification of the inclined plane, being formed of two inclined planes placed base to base. The screw is another modification, being, in fact, merely an inclined plane wound round a cylinder. Its common application is to elevate bodies, which are raised perpendicularly while they are moved up the plane. And the mechanical advantage is as the increased distance moved over: that is, as the length of the inclined plane is to the perpendicular height gained. Thus, if the inclined plane is one hundred times as long as it is high, not taking friction into account, it will require only the hundredth of a given weight to raise it along the inclined plane; but in accordance with that invariable law, 'What is gained in power is lost in time,' the power will move one hundred times as far as the perpendicular distance through which the weight is raised, and will take one hundred times as long a time as if the inclined plane were not used with it. The inclined plane, in this case, bears ninety-nine hundredths of the weight of the body.

IN CŒ'NA DOM'INI (at the Lord's supper: *Lat.*), the title of a celebrated papal bull, which enumerates certain rights claimed by the Romish church, and anathematizes those who violate them. All sects of heretics are cursed in it, by their several names. It was formerly read every year on Holy Thursday, whence its name; but latterly on Easter Monday. A copy of it is hung up on the door of St. Peter's, and another on that of St. John Lateran; and all primates, patriarchs, bishops, &c., are required to have it read in their churches once or more every year.

INCOG'NITO (abbreviated to *incog*, unknown: *Ital.*), so disguised as not to be recognized; a mode of travelling without any mark of distinction, which is sometimes adopted by princes and eminent persons who do not wish to be publicly received.

INCOMBUS'TIBLE CLOTH (*in*, not; and *combustibilis*, that may be burned: *Lat.*), a cloth made from a stone termed *Amianthus* or *Asbestos*. The ancients used it for wrapping round the dead bodies consumed on the funeral pyre, that their remains might not mingle with those of the wood, &c., used to consume them.

INCOMMEN'SURABLE (*in*, not; *con*, together; and *mensurabilis*, that can be measured: *Lat.*), a term applied to two lines or quantities which have no common measure by which they can be exactly divided. Quantities are *incommensurable*, when no third quantity can be found that is an aliquot part of each.

INCOMPAT'IBLE (*in*, not; and *compassibilis*, that may be suffered together: *Lat.*), in Chemistry, bodies which cannot be placed together in solution without mutual decomposition; thus the solution of a salt of barytes is incompatible with the solution of a sulphate.——In a Legal sense, that is *incompatible* which cannot be united in the same person without violating the law or constitution.

INCOMPRESSIBIL'ITY (*in*, not; and *compressibilis*, that may be pressed together: *Lat.*), that property of a body which renders a diminution of its volume impossible. No substance is quite incompressible; but fluids are compressible to so slight an extent that in practice they are considered incompressible.

INCORPORA'TION (*incorporo*, I form into a body: *Lat.*), in Chemistry, the mingling the particles of different bodies together into one mass, in such a manner that the different ingredients cannot be distinguished.——In Law, the formation of a legal or political body, with the quality of perpetual existence or succession, unless limited by the act of incorporation or formally put an end to by an act of the law.

INCRAS'SATE (*incrasso*, I make thick: *Lat.*), in Pharmacy, to make fluids thicker by the mixture of other substances less fluid, or by evaporating the thinner parts.——INCRASSATE, in Botany, becoming thicker.

IN'CREMENT (*incrementum*, an increase: *Lat.*), a term employed in Newton's method of fluxions to denote a small but finite increase of a variable quantity. It is the difference between two successive values of a quantity which increases according to a certain law.

INCRES'CENT (*incresco*, I increase: *Lat.*), in Heraldry, an epithet applied to the moon when she is increasing.

INCRYSTALLI'ZABLE, incapable of being formed into crystals.

INCUBA'TION (*incubatio*: *Lat.*), the process of a bird sitting on eggs, and hatching its young. The time required for this varies: domestic fowls sit three weeks; ducks, geese, and turkeys, a month; pigeons, eighteen days, &c. In the large majority of cases the female discharges this office, but in the case of the Australian emu and the Brazilian ostrich, it is the male bird that hatches the eggs. There are some species of which neither male nor female incubates. The eggs of the cassowary are deposited in the sand and left to be hatched by the heat of the sun. All the species of *Megapodius*, a galline genus peculiar to Australia and the large islands of the Indian archipelago, erect mounds of vegetable matter over their eggs, the fermentation of which emits heat sufficient to hatch them. Mounds fifteen feet high and sixty feet in circumference at the base have been erected by the jungle fowl of Australia, a bird no larger than our common fowl. Again, it is well known that our cuckoo lays its eggs in the nests of other birds, by which they are hatched; and there is a genus (*Molothrus*) of Brazilian birds allied to our starling which do precisely the same thing. This habit is connected with a physiological reason. *Artificial incubation* is carried to a high degree of perfection, both in Egypt and in China; and of late it has been tried in London, with success.

IN'CUBUS (*incubo*, I lie upon: *Lat.*), the *nightmare*, a disease which consists in a spasmodic contraction of the muscles of the breast during sleep, attended with a very painful difficulty of respiration and great anxiety. The most obvious symptom is a sensation of some great weight laid upon the breast: hence the name. Sometimes the sufferer finds himself in some inextricable difficulty, endeavouring to escape from a monster, or, perhaps, in imminent danger of falling from a precipice, while his limbs refuse to do their office, until he suddenly awakens himself by starting from his recumbent posture, or by a cry of terror. It is generally owing to repletion and indigestion, and is often superinduced by lying on the back.

INCUM'BENT (*incumbo*, I recline upon: *Lat.*), the person who is in present possession of an ecclesiastical benefice.

INCUNAB'ULA (the age of infancy: *Lat.*), books of the fifteenth century, the cradle days of printing, are so called by bibliographers.

IN'CUS (an anvil: *Lat.*), in Anatomy, the largest and strongest of the bones in the tympanum of the ear, so called from its resembling an anvil in shape.

INDEFE'ASIBLE (*indéfaisible*, that cannot be undone: *Fr.*), in Law, an epithet for an estate, or any right, which cannot be defeated or made void except by the act of the grantee.

INDEF'INITE (*indefinitus*, undetermined: *Lat.*), in Botany, when the stamens exceed twenty in number, or when other parts cannot be easily counted. It always refers to *number*.

INDEM'NITY (*indemnitas*, security from loss: *Lat.*), in Law, a writing to secure one from all damage and danger that may ensue from any act.——ACT OF INDEMNITY, an act passed every session of parliament for the relief of those who have neglected to take the necessary oaths, &c.

INDEN'TED (*in*; and *dentatus*, toothed: *Lat.*), in Heraldry, an epithet for a line which is notched or cut like a saw.

INDENT'URE (same *deriv.*), in Law, a writing containing an agreement or contract made between two or more persons; so called because it was indented or cut scallopwise, so as to correspond with the counterpart. But *indenting* is often neglected, while the writings or counterparts retain the name of *indenture*.

INDEPEN'DENTS (*in*, not; and *dependens*, hanging from: *Lat.*), a sect of Protestant dissenters, distinguished, not by doctrine, but by discipline. They regard every congregation of Christians meeting in one building for the purpose of public worship as a complete church, *independent* of any other religious government; they reject the use of all creeds, as impious substitutes for the letter of the Scripture, and attribute no virtue whatever to the right of ordination. The direction of each church is vested in its elders. The *Independents* arose in the reign of Elizabeth; and during the civil wars of England, in the 17th century, they formed a powerful party. They have had for some time in England more than 1700 chapels; in Scotland, more than 100; in Ireland, more than 30; and no less than 1000 in the United States.

INDETER'MINATE QUAN'TITY (*in*, not; and *determino*, I limit: *Lat.*), in Mathematics, a quantity which has no certain or definite value. Thus, in an ellipse, the values of co-ordinates are indeterminate, while the axes are constant quantities.—INDETERMINATE ANALYSIS, that particular branch of analysis which treats of the solution of *indeterminate problems*, or such problems as admit of an indefinite number of different solutions.

IN'DEX (*Lat.*, from *indico*, I declare), in Arithmetic and Algebra, the number that shows to what power a quantity is to be raised; the *exponent*. Thus in 4^5, 5 is the *index*, and points out how many fours are to be multiplied together, to produce the given quantity. This kind of notation enables us to simplify arithmetical and algebraic operations. Thus we can find at once that the fifth root of 4^5 is 4. Without this notation, 4^5 would be represented by a comparatively large number, 1024; and to find its fifth root we should have recourse to a complicated process. This holds to a still greater extent when there is question of a very large number, and a more difficult root is to be extracted: thus, the eighth root of 1568473^{16} is found with the greatest ease. [See LOGARITHMS.]

IN'DEX EXPURGATO'RIUS. [See EXPURGATORY INDEX.]

IN'DIAN INK, a substance brought from China, and used as a water-colour. It is in rolls or cakes, and is said to consist of lamp-black and animal glue.

IN'DIAN RED, a pigment of a purple russet here employed in water-colour painting. It is a peroxide of iron and is obtained in Bengal.

IN'DIAN RUB'BER. [See CAOUTCHOUC.]

IN'DIAN YEL'LOW, a pigment used by water colourists, brought from India. It is of unknown origin, but is found to be a compound of magnesia and a substance termed purreic acid.

IN'DIANITE, a mineral occurring in granular masses, and associated with garnet, felspar, fibrolite, and hornblende. It will scratch glass, and is of a white or grey colour.

INDIC'ATIVE (*indicativus*: *Lat.*), in Grammar, the first mood, or manner, of conjugating a verb, by which we simply affirm, deny, or indicate something; as, he *writes*, they *run*.

INDIC'TION, CYCLE OF (*indictio*: *Lat*), in Chronology, a mode of computing time by periods of fifteen years. [See CHRONOLOGY, CYCLE, &c.]

INDI'CTMENT (*indico*, I proclaim against: *Lat.*), in Law, a written accusation of one or more persons for a crime or misdemeanor, preferred to, and presented on oath by, a grand jury. In determining whether there is reasonable cause to put the accused upon his trial, the grand jury hear evidence only of the charge; and if twelve of them are satisfied of the truth of the charge, the indictment is then said to be *found*, and is publicly delivered into court, endorsed *true bill*; otherwise, *not found*.

INDIG'ENOUS (*indiges*: *Lat.*), an epithet applied to the native animals and plants of a country, exclusive of those that have been introduced from other countries.

IN'DIGO (*indikon*, literally from *India*: *Gr.*), a most valuable dye, prepared from the leaves and stalks of leguminous plants, chiefly shrubs, belonging to the genus *Indigofera*. These are steeped in water and allowed to ferment. A yellow substance is thus obtained, which becomes blue by exposure to the air. The indigo is drained in bags and dried in boxes. The indigo of commerce is in the form of small square or oblong cakes; it is of a dark blue colour, passing into violet purple, is void of taste and smell; dull in appearance, but, by rubbing with a smooth hard body, it assumes the lustre and hue of copper. Sulphuric acid is the only agent that dissolves indigo without destroying its colour. When it is put into this acid, a yellow solution is at first formed, which, after a few hours, acquires a deep blue colour. If indigo is exposed to the action of certain deoxidizing agents, it forms a green solution with alkalis, from which it is precipitated white by acids. This *white indigo* is termed *Indigogene*; it instantly becomes blue on exposure to the air, forming indigo, which is supposed to be its oxide. The solution of indigo in strong sulphuric acid is known by the name of *Saxon blue*. Bengal is the great mart for indigo, but it is cultivated in other parts of India. The introduction of indigo met with great opposition from the growers of *woad*. Down to a recent period, the dyers of Nuremberg were obliged to take, every year, an oath not to use it; but its excellence as a dye ultimately gained it the victory. There can be no doubt that the *indicum* mentioned by Pliny was indigo, though he was mistaken as to its origin.

INDIG'OLITE (*indikon*, indigo; and *lithos*, a stone: *Gr.*), in Mineralogy, a variety of shorl or tourmaline, of an indigo or blue colour, sometimes tinged with green or azure.

INDIGOT'IC or ANILIC A'CID, in Chemistry, an acid obtained by boiling indigo in nitric acid, diluted with ten parts of water. It forms white or yellowish needles.

INDIVIS'IBLES (*indivisibilis*, not divisible: *Lat.*), in Geometry, those elements or principles into which it may be supposed that any body or figure can be ultimately resolved.

INDORS'ER (*endosseur*: *Fr.*) [See BILL, and EXCHANGE.]

INDUC'TION (*inductio*, a leading into: *Lat.*), the process by which magnetism or electricity is developed in a body by the magnetic or electric action of another body. Thus a bar of soft iron when brought near a magnet will be rendered magnetic, but returns to its former natural state if removed. Again, if a copper wire be coiled round a smaller bar of iron and a current of voltaic electricity be sent through the wire, the bar becomes instantly magnetic, but ceases to be so the moment the current is stopped. Again, if a conducting body be brought into the proximity of another body charged with electricity, the former will at once manifest signs of electrical action, positive electricity being developed on one side, and negative on the other.

INDUCTION, in Law, the introduction of a clergyman into possession of a benefice or living, to which he is collated or presented.

——INDUCTION, in Logic, a process of reasoning, by which we draw a general inference from a number of facts. Applied to physical enquiries, it has been styled generalisation from experience. It consists (says J. S. Mill) in inferring from some individual instances in which a phenomenon is observed to occur, that it occurs in all instances of a certain class; namely in all which *resemble* the former in what are regarded as the material circumstances.

INDUL'GENCE (*indulgentia*, a pardon: *Lat.*), in the Roman Catholic church, a remission of the punishment due to sins, granted by the pope or church, and supposed to save the sinner from purgatory. Clement VI., in his decretal, declares that an infinite treasure of merits was left by Christ, arising from his own sufferings and the good works of the Virgin and the saints; and that the pastors of the church, and more especially the popes, who are the sovereign disposers of this treasure, have authority to apply it to the living, by virtue of the keys, and to the dead, by way of suffrage, so as to discharge them from their respective proportions of punishment by taking just so much merit out of this general treasure as they conceive the debt requires, and offering it to God. The historical origin of indulgences is traced to the public penances and the canonical punishments which the old Christian church imposed on the community, especially on those who did not remain firm unto martyrdom. In the pontificate of Leo X., the flagrant abuse of indulgences became an open scandal, and led to the reformation in Germany.

INDUL'TO (a pardon: *Ital.*), in the church of Rome, a power granted to present to benefices, or to do something contrary to ordinary law.

INER'TIA or VIS INER'TIÆ (inactivity; the effect of inactivity: *Lat.*), in Mechanics, that property of matter which causes it, as it were, to resist a change of state: that is, prevents it from stopping when in motion, and from moving when at rest. But it may be said, that however great the velocity of a moving body, it will always stop at last. This is true: but it does not stop *of itself;* it is stopped by the resistance of the air and by friction. No such agents interfere with the motions of the heavenly bodies, and therefore they continue to obey the impulse they originally received. This seeming resistance of bodies to motion or rest is merely a consequence of the necessity there is for time to elapse while they are receiving or losing motion, which can neither be imparted nor removed instantaneously.

INESCUTCH'EON, in Heraldry, a small escutcheon borne within the shield.

IN ES'SE (*Lat.*), actually existing; distinguished from *in posse*, which denotes that a thing is not, but may be.

IN'FAMY (*infamia: Lat.*), in Law, that total loss of character or public disgrace by which a person was formerly rendered incapable of being a witness or a juror. No person is now excluded, on this account, from being a witness.

IN'FANCY (*infantia*, literally inability to speak: *Lat.*), the period, physically considered, from birth to seven years; and legally till twenty-one, previously to which age no one can inherit, or incur any debt except for necessaries. The contracts of a minor, however, are not void, but voidable; and though they cannot be enforced against him, he may enforce them against another, and may confirm them at the end of his minority. Under seven years of age, he cannot be guilty of felony; between seven and fourteen, there is a presumption that he is *doli incapax* (not capable of guilt); but, if it is shown that he could distinguish between good and evil, he may be condemned even to death.

INFAN'TE and INFAN'TA, appellations given to all the sons and daughters of the kings of Spain and Portugal, except the eldest. The dignity of the title consists in the pre-eminence implied by styling the children of the king *the* children. It was anciently given to all hidalgos. The word *childe* was used in a similar way in England during the middle ages.

IN'FANTRY (*infanterie*: *Fr.*), in Military affairs, the whole body of foot soldiers, as distinguished from *cavalry*. Infantry is divided into *light infantry* and that of *the line*. The latter forms the great mass of the army, which is intended to fight in line. The light infantry serves chiefly in the outposts, furnishes sharpshooters, makes bold expeditions, and harasses the enemy. The excellence of infantry depends on their good order in advancing and retreating, perfect acquaintance with their drill and duties, a just delivery of their fire, and great calmness in all circumstances. In the British army there are 109 regiments of regular infantry.

INFEC'TION (*inficio*, I corrupt: *Lat.*), the morbid effluvia of one animal body affecting the similar organs of another: as small-pox, putridity, &c. It has been questioned whether this effect can be carried from place to place, and whether most diseases, called infectious, are not occasioned by local circumstances which affect certain subjects in the population. Infection is considered to differ from contagion, by being communicated through the air instead of from person to person. The *infection* of the plague and of the yellow fever is imported in ships and conveyed in clothing; persons also take *infection* from the air of apartments where the sick are confined.

INFER'NAL MACHI'NE, a name which has been given on more than one occasion to a terrific engine invented for the purpose of assassination. That which was intended for the destruction of Louis-Philippe, on the 28th July, 1835, and which, though the king and his three sons who were riding with him escaped, killed sixteen and wounded eighteen persons, consisted of a number of gun-barrels, so arranged in a frame as to be fired off in a volley.

IN'FIDEL (*infidelis*, *Lat.*), a term of re proach for any one who rejects the fundamental articles of religious belief of a country. In Turkey the Christians are styled infidels; in Europe, the Mahommedans.

INFILTRATION, the act or process of entering the pores or cavities of a body. [See FILTRATION.]

IN'FINITE (*infinitus*, boundless: *Lat.*). In Mathematics, *infinite quantities* are such as are either greater or less than any assignable ones. An *infinite series* is one in which the terms continue to be produced unceasingly.

INFINITES'IMAL (from a superlative form of *infinitus*, boundless: *Lat.*), a term denoting an indefinitely small quantity.

INFIN'ITIVE (*infinitus*, boundless: *Lat.*), in Grammar, a mood expressing the action of the verb, without affirming or denying it of any subject.

INFIN'ITY (*infinitas: Lat.*), a term applied to the vast and the minute, to distances and spaces too great to be expressed by any number of integers, or too small to be expressed by any fraction; one of the incomprehensible but necessarily existing wonders of the universe.

INFIR'MARY (*infirmus*, weak: *Lat*), a charitable establishment, where the poor may receive medical advice and medicines gratis

INFLAMMA'TION (*inflammatio*, a preternatural heat: *Lat.*), in Pathology, a state of any portion of the animal body, characterized by heat, pain, and redness, attended with more or less of tumefaction and fever. Inflammation is divided into two species, *phlegmonous* and *erysipelatous:* the former is known by its bright red colour, tension, heat, and painful tumefaction; the latter, by its dull red colour, vanishing upon pressure, and its exhibiting scarcely any perceptible swelling. Besides this division, inflammation is either acute or chronic, local or general, simple or complicated with other diseases. In inflammation, the vascular action of the part is increased; and if it does not terminate in *resolution*, it ends by *adhesion*, *suppuration*, and *ulceration*, which, when the action is healthy, follow each other regularly.

INFLECT'ED (*inflecto*, I bend in: *Lat.*), in Botany, an epithet for a leaf that is bent inwards at the end towards the stem; also for a calyx that is bent inwards.

INFLEC'TION (*inflectio*, a turning: *Lat.*), in Optics, the bending or refraction of the rays of light, caused by the unequal thickness of any medium.——INFLECTION, in Grammar, the change which a word undergoes in its termination, to express case, number, gender, mood, tense, &c.——POINT OF INFLECTION, in Geometry, that point in which the direction of a curve changes from concavity to convexity, and *vice versâ*.

INFLORES'CENCE (*infloresco*, I flourish: *Lat.*), in Botany, the manner in which flowers are arranged on the axis, or the branching of the floral axis. It is sometimes termed *Anthotaxis*.

INFLUEN'ZA (influence: *Ital.;* because produced, in the opinion of the ignorant, by the influence of the stars), in Medicine, an epidemic catarrh, usually attended by languor, headache, quick pulse, and febrile symptoms, which are sometimes of a serious character. It assumes a variety of aspects, dependent on the seasons and other causes. It is supposed to arise from the presence in the air of a minute quantity of highly irritating vapour.

IN FORMA PAUPERIS. [See FORMA PAUPERIS.]

INFORMA'TION (*informatio*, a representation: *Lat.*), in Law, an accusation or complaint exhibited against a person for some criminal offence. An information differs from an *indictment*, inasmuch as the latter is laid on the oath of twelve men, but the information is only the allegation of the person who exhibits it. Informations are charges on oath, laid before a justice or justices of the peace, with a view to summary conviction; or a complaint brought by the crown itself. The latter is of two kinds: that which is filed *ex officio* by the attorney-general, in some particular kinds of misdemeanor of a public nature, and calculated to affect the government, and that filed, at the relation of some private person or informer, by the master of the crown office, for certain gross misdemeanors not immediately calculated to disturb the government.

INFORM'ED STARS (*stellæ informes: Lat.*), in Astronomy, stars not included in any constellation.

IN FORO CONSCIENTIÆ (in the court of conscience: *Lat.*), an expression made use of when a man is morally but not legally bound to do something.

INFRALAPSA'RIANS (*infra lapsum*, under the fall: *Lat.*), Presbyterians who hold that God created a certain number of human beings, who must be damned whatever efforts they make to avoid it. They are so called, because they maintain that God formed his decrees after his knowledge of the fall, and in consequence of it. [See SUPRALAPSARIANS]

IN'FULA (*Lat.*), in Roman Antiquity, a kind of fillet, made of white wool, loosely twisted, and tied with a white band. At Roman marriages, the bride carried wool on a distaff in the procession, and fixed it as an infula on the door-case of her future husband. The *infula* was used also as an ornament on festive and solemn occasions

INFUNDIBU'LIFORM (*infundibulum*, a funnel; and *forma*, a form: *Lat*), in Botany, having the shape of a funnel, as, a flower with a conical border rising from a tube.

INFUNDIB'ULUM CER'EBRI (the funnel of the brain: *Lat*), in Anatomy, a cavity of the brain through which serous humours are discharged.

INFU'SION (*infusio*, a pouring upon: *Lat.*), in Pharmacy, a method of obtaining the active constituents of plants, roots, &c., by pouring hot water upon them. Also, the liquor in which the plants, &c, are steeped, and which is impregnated with their peculiar qualities.

INFUSO'RIA (*infusus*, poured upon *Lat.*), animalcules which are so termed because found very abundantly in stale infusions. The name was formerly applied to a heterogeneous assemblage of objects, some vegetable, others animal, but it is now restricted to a tribe of minute animals, destitute of shells, and moving by means of cilia. They are objects of study to microscopists. [See DIATOMACEÆ, POLYCYSTINA, ROTATORIA.]

IN'GOT (*lingot: Fr.*), a small bar of metal made of a certain form and size by casting it in moulds. The term is chiefly applied to the small bars of gold and silver intended either for coining or for exportation to foreign countries.

IN'GRAILED (*in*; and *grêle*, hail: *Fr.*), in Heraldry, an epithet for anything represented with the edges ragged, or notched semicircularly, as if broken by something having fallen upon it, the points being turned outward to the field. When they are turned inwards towards the ordinary, it is *invecked*.

IN'GRESS (*ingressus: Lat.*), in Astronomy, a term applied to the entrance of the moon into the shadow of the earth in eclipses, the sun's entrance into a sign, &c. ——INGRESS, *egress*, and *regress*, in Law, words frequently used in leases of lands, which signify a free entry into, a going out of, and returning to the premises leased.

IN'GUINAL (*inguinalis*, from *inguen*, the groin: *Lat.*), in Anatomy, &c., belonging to the groin. Hence *inguinal hernia*, called by surgeons *bubonocele*, is a hernia in that part.

INHER'ITANCE (*hæreditas: Lat.*), a perpetual right or interest in an estate, vested in a person and his heirs. The inheritances mentioned in our law are either corporeal or incorporeal: the *corporeal* relate to lands, tenements, &c., that may be touched or handled; and the *incorporeal*, to such rights as are annexed to corporeal inheritances, as advowsons, tithes, annuities, offices, &c. There is likewise another inheritance, which is termed *in severalty*: that is, where two or more hold lands or tenements severally, as when two persons hold to them and the heirs of their two bodies; in which case these two have a joint estate during their lives, but their heirs have several inheritances. According to the law of inheritance, the eldest male child is always preferred, in case of intestacy, while sisters take equally where there are no sons. He that is of the whole blood is preferred [see DESCENT] before another that has only a part of the blood of his ancestor. Goods and chattels cannot be made heritable. [See HEIRLOOM.]

INHIBI'TION (*inhibitio*, from *inhibeo*, I restrain: *Lat.*), in Ecclesiastical Law, a writ to forbid a judge's proceeding in a cause that lies before him. This writ generally issues out of a higher court to an inferior, and is of much the same nature as a prohibition.

INJEC'TION (*injicio*, I throw into: *Lat.*), in Anatomy, the act of filling the vessels of a dead subject with any coloured matter, to show their ramifications.——INJECTION, in Surgery, the forcing any liquid into the body by means of a syringe or pipe.

INJUNC'TION (*injunctio*, a command: *Lat.*), in Law, a writ issuing under the seal of a court of equity, where the court thinks fit to interfere with the acts of parties or the course of other jurisdictions. Thus, injunctions are granted to stay proceedings at common law, to prevent the negotiation of notes or other securities, to restrain parties from the commission of waste, to preserve property which is in the course of litigation, &c. Disobedience of an injunction is a contempt of the court from which it issues, punishable by imprisonment.

IN'JURY (*injuria: Lat.*), in a legal sense, any wrong or damage done to another, either in his person, rights, reputation, or goods. Whatever impairs the quality or diminishes the value of goods or property, is an *injury*; so also whatever impairs the health, weakens the mental faculties, or prejudices the character of a person, is an *injury*.

INK (*encre: Fr.*). Tangallate of iron, kept suspended in water by gum-arabic, a little logwood being generally added to improve the colour, constitutes common writing ink. It may be made by boiling six ounces of finely bruised galls in six pints of soft water, and adding to the decoction four ounces of gum-arabic and four ounces of green vitriol. The whole must be well mixed, and then placed in a well-corked bottle, which should be occasionally shaken After two months, the ink is to be poured off from the residue into glass bottles, into each of which a clove or two, or a drop of creosote, has been put, to prevent mouldiness, and well corked. A little sugar gives a gloss; and as it prevents rapid drying, is added to *copying ink*. *Indian ink* is made with very fine lampblack and size *Marking ink* may be made by dissolving one drachm of fused nitrate of silver (lunar caustic) in an ounce of water, which has been previously thickened with sap green. Before writing with it, the linen must be prepared, by the application of a weak solution of carbonate of soda thickened with gum-arabic, and allowed to dry. *Printing ink* is boiled linseed or nut oil, and lampblack. *Red ink* is a solution of alum coloured with Brazil wood. *Sympathetic inks* are of many kinds; they remain invisible until heated, or until some substance is applied to them. Thus, solutions of cobalt become blue or green while heated; lemon-juice turns brown in the same circumstances, and very dilute sulphuric acid blackens. The heat concentrates the acids, and enables them to act on the paper. A writing made with a weak infusion of galls becomes visible if wetted with a weak solution of sulphate of iron; if made with a weak solution of prussiate of potash, it is rendered visible by a solution of sulphate of iron, &c.

IN'LAND BILLS, in Commerce, bills payable in the country where they are drawn.

INLAY'ING, the art of ornamenting furniture, or other similar objects, by letting into them pieces of metal, ivory, or other wood.

IN LIM'INE (on the threshold: *Lat.*) at the outset; before anything is said or done.

IN'NATE IDE'AS (*innatus*, born with us *Lat.*), principles or ideas supposed to be stamped on the mind from the first moment of its existence, and brought into the world with it: a doctrine which has given rise to much discussion, and which the celebrated Locke took great pains to refute.

INN'KEEPERS were formerly liable to make good all losses of property belonging to their guests and brought to the inn. But now by an Act of Parliament passed in 1863, no innkeeper is liable to make good any loss to property brought to his inn (not being a horse or carriage) to a greater amount than 30*l.*, except in two cases: viz. 1, where the innkeeper or his servant has been guilty of wilful neglect; and, 2, where the goods have been deposited with the innkeeper expressly for safe custody.

IN'NOCENTS' DAY, a festival observed by the Christian church on the 28th of December, in memory of the children that were slain by command of Herod.

INNOMINA'TUM (not named: *Lat.*). The bones at each side of the pelvis are called *os innominatum* (an unnamed bone), because the three bones of which it consists in the young subject, viz. the *ischium* or hip-bone, the *ilium* or haunch-bone, and the *pubis* or share-bone, grow together in the adult, so as to form a single bone, which is thus left without a name.

INNS OF COURT, four corporate societies in London. Every candidate for the rank of barrister-at-law must be admitted a member of one of them, and submit to its regulations, as a student. They are, the *Inner Temple*, the *Middle Temple*, *Lincoln's Inn*, and *Gray's Inn*. The government of each of these inns is vested in a body of senior members styled Masters of the Bench, or Benchers, and they alone have the privilege of calling gentlemen to the bar. Each inn has its own hall and library. The Temple Church belongs jointly to the two Temples; the other two inns have their separate chapels.

INOCULA'TION (*inoculatio*, an ingrafting: *Lat.*), in Surgery, the operation of giving the small-pox to persons, by incision. In its more general sense, it includes the insertion of any poisonous or infectious matter. Inoculation for the small-pox was introduced into general notice by Lady Mary Wortley Montagu, about the year 1721, her son having been inoculated at Constantinople during her residence there, and her infant daughter being the first that underwent the operation in this country. It is performed by inserting the point of a lancet, armed with the proper matter, just under the cuticle. The disease is milder when produced in this way than when received naturally. The communication of the cow-pock infection is termed *Vaccination*, which see.——INOCULATION, in Gardening, a kind of grafting in the bud; as when the bud of one fruit-tree is set in the stock or branch of another, so as to make several sorts of fruit grow on the same tree. The time to *inoculate* is when the buds are formed at the extremities of the same year's shoot, indicating that the spring growth for that season is complete.

INOR'DINATE PROPOR'TION (*inordinatus*, out of order: *Lat.*), in Geometry, that in which the order of the terms compared is irregular or disturbed.

INORGAN'IC BOD'IES (*in*, not; and *organicus*, organized: *Lat.*), such as belong neither to the animal kingdom nor to the vegetable.

INOSCULA'TION (*in*; and *osculatio*, a union of blood-vessels, literally a kissing: *Lat.*), in Anatomy, the union of vessels, by conjunction of their extremities; where the ramifications which unite are small or capillary, the vessels are usually said to *anastomose*. [See ANASTOMOSIS.]

IN PARTI'BUS INFIDE'LIUM (in the parts of unbelievers: *Lat.*), a phrase employed with reference to certain vicars apostolic appointed by the Pope, with the titles of ancient and no longer existing dioceses, to dioceses in heretical or heathen lands. They were first appointed for India and other parts of the East.

IN PRO'PRIA PERSO'NA (*Lat.*), in one's own person or character.

IN'QUEST (*inquæsitus*, sought for: *Lat.*), a judicial inquiry. It may either be a jury to decide on the guilt of an accused person, according to fact and law; to examine the weights and measures used by shopkeepers; to decide on the cause of any violent or sudden death; or to examine into accusations before trial.

INQUI'RY (*inquiro*, I search for: *Lat.*) WRIT OF, in Law, a writ that issues out to the sheriff, to summon a jury to inquire what damages a plaintiff has sustained in an action upon the case where judgment goes by default.

INQUISI'TION, OFFICE OF THE (*inquisitio*, a searching for: *Lat.*), an ecclesiastical court founded by Innocent III., who, in 1206, sent Dominic and others to excite the Roman Catholic princes and people to extirpate heretics, to inquire into their number and quality, and to transmit a faithful account of these particulars. From the nature of their office, these agents were called *inquisitors*; and thus arose a tribunal which was received in all Italy, and throughout the dominions of Spain, excepting the kingdom of Naples and the provinces of the Netherlands. The principle of jurisprudence upon which the Inquisition proceeded was that of taking no other proof of a delinquent's guilt than his own confession. He was closely confined in a dark and dismal cell, where he was compelled to sit motionless and silent, and if his feelings found vent in a tone of complaint, the ever-watchful keeper warned him to be silent. He was accused of nothing specific, but was told that his guilt was known, and was required to acknowledge it. If he confessed the crime of which he was accused, he pronounced his own sentence, and his property was confiscated. If he declared himself innocent, contrary to the testimony of his secret accusers, he was put to the torture. When sentence of death was pronounced against him, the *auto-da-fé* was ordered. At daybreak, the solemn sound of the great bell of the cathedral called the faithful to the dreadful spectacle. The condemned appeared barefooted, clothed in the frightful *san benito*, a frock of yellow sackcloth painted with flames, &c., and a conical cap on their heads. The Dominicans, with the banner of the Inquisition, led the way. Then came the penitents, who were to be punished by fines, &c., and after the cross, which was borne behind the penitents, walked the unfortunate wretches who were condemned to be burnt alive. The procession was closed by monks and priests, and the *heretics* were then handed over to the executioner, who finished the horrid spectacle in the presence of the multitudes assembled to witness the agonies of the victims! According to a calculation which may be depended on as moderate, 340,000 persons were punished by the Inquisition, from 1481 to 1808, of whom nearly 32,000 were burnt. The Inquisition had been abolished during the French rule in Spain; it was re-established by Ferdinand VII in 1814; but on the adoption of the constitution of the Cortes, in 1820, it was again abolished. It was established in Portugal in 1557, but was abolished by the Cortes in 1821. There were also branches of the Inquisition in different parts of France, Italy, &c.; but the progress of civilization has left them little power anywhere, and has put an end to their existence in most places.

INQUIS'ITOR (a searcher: *Lat.*), in Law, any officer, as the sheriff and the coroner, having power to inquire into certain matters.——GRAND INQUISITOR, the name given to a judge of the Inquisition.

INRO'LLMENT, in Law, the registering or entering on the rolls of the Court of Chancery or some other Court, any deed, decree, judgment, or other act that the law requires to be inrolled.

INSAN'ITY (*insanitas*: *Lat.*), mental derangement of any degree, from a slight aberration to raving madness. It is, however, rarely used to express the temporary delirium occasioned by fever, &c.

INSCRI'BED FIG'URE (*inscribo*, I write in: *Lat.*), in Geometry, a circle drawn within any figure, and touching all its sides; or a figure drawn within a circle which touches all its angles.

INSCRIP'TI (inscribed: *Lat.*), in Roman Antiquity, a name given to those who were branded with any ignominious mark.

INSCRIP'TION (*inscriptio*: *Lat*), any monumental writing, engraved on or affixed to a thing, to give a more distinct knowledge of it, or to transmit some important fact to posterity. The inscriptions mentioned by Herodotus and Diodorus Siculus sufficiently show that this was the first method of conveying instruction to mankind, and transmitting knowledge to posterity; thus, the ancients engraved upon pillars both the principles of sciences and the history of the world. Pisistratus carved precepts of husbandry on pillars of stone; and the treaties of confederacy between the Romans and Jews were engraved on plates of brass. Antiquarians have accordingly been, at all times, very anxious to examine the inscriptions on ancient ruins, coins, medals, &c.——INSCRIPTION, in Numismatics, words placed in the middle of the reverse side of some coins and medals.

INSEC'TA (*Lat.*, from *inseco*, I cut into), a class of articulate animals. [See ENTOMOLOGY.]

INSECTIV'OROUS (*insecta*, insects; and *voro*, I devour: *Lat.*), an epithet for such animals as feed on insects.

IN SITU, a Latin phrase employed by geologists with reference to a rock which retains its original position in distinction to a fragment which has been moved from its place.

INSOLA'TION (*insolatio*. *Lat.*), a term sometimes made use of to denote that exposure to the sun which is made in order to promote the chemical action of one substance upon another: thus, the *immediate* combination of hydrogen and chlorine, so as to form hydrochloric acid.——INSOLATION or *scorching*, a disease in plants arising from exposure to too bright a light, and due to an excessive evaporation.

INSOL'VENCY (*in*, not; and *solvo*, I pay: *Lat.*), the state of a person who has not property sufficient for the payment of his debts.

INSPIRA'TION (*inspiratio*, a breathing into: *Lat.*), in Physiology, the act of drawing air into the lungs.

INSPISSA'TION (*inspissatus*, thickened: *Lat.*), in Chemistry, the bringing a liquor to a thicker consistence by evaporation.

INSTALLA'TION (*in*; and *stallum*, a stall: *Mod. Lat.*), the ceremony of inducting, or investing with any charge, office, or rank; as, the placing a dean or prebendary in his stall or seat, or the admission of a knight into his order.

INSTAL'MENT (*installer*, to put in possession of a place, &c.: *Fr.*; from *stello*, I send: *Gr.*), in commercial transactions, the payment of a certain portion of a gross sum, which is to be paid at different times, or, as it is said, by *instalments*. In constituting a capital-stock by subscriptions of individuals, it is customary to afford facilities to subscribers by dividing the sum subscribed into instalments, or portions payable at distinct periods. In large contracts, also, it is not unusual to agree that the money shall be paid by instalments.

IN'STANT (*instans*: *Lat.*), the smallest perceptible portion of time; or that in which we perceive no succession. Schoolmen distinguish three kinds of instant: the *temporary*, a portion of time preceding another; the *natural*, which is a mere priority of nature; and the *rational*, which is not a real point, but one which the understanding supposes to have existed before another, from the nature of things, which cause it to be looked on as pre-existing.

INSTAN'TER (*Lat.*), in Law, instantly, without the least delay; as, 'the party was compelled to plead *instanter*.'

IN STA'TU QUO (in the state in which: *Lat.*), a phrase signifying that condition in which things were at a certain former period; as when belligerent parties, in concluding a treaty, agree that their mutual relations shall be *in statu quo fuerunt ante bellum*, or as they were before the commencement of the war.

IN'STINCT (*instinctus*, impulse: *Lat.*), that power of volition or impulse produced by the peculiar nature of an animal, which prompts it to do certain things, independent of all instruction or experience, and without deliberation, not only where such acts are immediately connected with its own individual preservation, or with that of its kind, but often where they are altogether foreign to the apparent wants of the individual, and sometimes, also, extremely complicated. We cannot attribute these actions to intelligence, without supposing a degree of foresight and understanding infinitely superior to what we can admit in the species that perform them. The actions performed by instinct are not the effects of imitation, for the individuals that execute them have often never seen them done by others. They are so much the property of the species, that all the individuals perform them in the same manner, without any modification or improvement. The duckling hastens to the water, the hen remains the proper time on her eggs during incubation, the beaver builds his curious habitation with a skill peculiar to the species, and the bees construct, with mathematical accuracy, their waxen cells. Instinct, then, is a general property of animated matter or a law of organized life in a state of action.

IN'STITUTE or INSTITU'TION (*institutio*, an arrangement: *Lat.*), any society established according to certain laws or regulations, for the furtherance of some particular object; such are colleges or seminaries for the cultivation of the sciences, literary institutes, mechanics' institutes, and others.——The word *institution* is applied also to a body of laws, rites, and ceremonies, which are enjoined by authority as permanent rules of conduct or of government; thus, the institutions of Moses or Lycurgus. And to a society of individuals established for the promotion of any public object; as a charitable or benevolent *institution*.——The term is used likewise for the putting a clerk into possession of a spiritual benefice; his title will, however, become void, unless, within two months after actual possession he publicly read in the church of the benefice upon some Lord's-day, and at one of the appointed times, the morning and evening service according to the Book of Common Prayer, and afterwards publicly declare his assent to such book, and also read the Thirty-nine Articles, and declare his assent to them; and within three months, on some Lord's-day, in the same place, read a declaration, by him subscribed before the ordinary, of conformity to the liturgy.

IN'STRUMENT, MUSICAL (*Fr.*), a machine, artificially constructed, for the production of musical sounds. It is of three kinds, the wind instrument, e. g. the flute, the stringed instrument, e.g. the violin, and the instrument of percussion, e.g. the drum.——INSTRUMENT, in Law, a deed or writing creating or declaring legal rights, and duly executed.

IN'SULATED (*insulatus*, made into an island: *Lat.*), in Architecture, an appellation given to such columns as stand alone, or free from any contiguous wall, &c., like an island in the sea: whence the name.

INSULA'TION (same *deriv.*), in electrical experiments, that state in which the communication of electric fluid is prevented by the interposition of a non-conductor.

INSU'RANCE, in Law and Commerce, the act of providing against a possible loss, by entering into a contract with one who is willing to give *assurance*; that is, to bind himself to make good such possible loss, should it occur. The instrument by which the contract is made is denominated a *policy*, and the stipulated consideration is called the *premium*. Besides policies for protection against losses by fire or risks at sea, there are others on *lives*, by which a party, for a certain premium, agrees to pay a certain sum, if a person, to whose life it relates, shall die within a time specified, or to pay the executors of the insured a certain sum at the time of his death. Such policies, however, usually make an exception in the case of death by suicide. In this way a family may be furnished with means of support in case of the death of its head. According to general practice, a life insurance is seldom made by the payment of a single sum at the time it is effected, but almost always by the payment of an *annual premium* during its continuance. An individual, therefore, who has insured a sum on his life, would forfeit all the advantages of the insurance were he not to continue regularly to make his periodical payments. The insurance of life is now more generally expressed by the word *assurance*.

INTA'GLIOS (*intagliare*, to cut in: *Ital.*), precious stones, on which are engraved the heads of eminent men, inscriptions, &c., and which are usually set in rings, &c. [See GEMS.]

IN'TEGER (*integer*, whole *Lat.*), in Arithmetic, any number which is not a fraction.

IN'TEGRAL CAL'CULUS (same *deriv.*), that branch of mathematical analysis which treats of the processes by which a function may be found, such that its differential shall be a given quantity. [See CALCULUS, DIFFERENTIAL.] When an integral is given, its differential may be obtained by general rules; but when a differential is given, the analyst can only compare the differential expression which is to be integrated with the differentials of known quantities, and, from such comparison, infer the form of the corresponding integral. There is no direct method of returning from the differential to the integral.

IN'TEGRANT PARTS (same *deriv.*), the parts of a body obtained by mechanical division. *Constituent parts* differ from these, in being the result of chemical decomposition.

INTEG'UMENT (*integumentum*: *Lat.*), in Anatomy, a covering or membrane which invests any particular part of an organized body. The skin of a leaf and the shell of a crab, for example, are integuments.

IN'TELLECT (*intellectus*: *Lat.*), that faculty of the human mind which receives or comprehends the ideas communicated to it; otherwise called the *understanding*.

INTEN'DANT (*intendo*, I give my mind

to anything: *Lat.*), a word much used in France, and denoting a person who has the charge, direction, or management of some office or department; as an *intendant* of marine, an *intendant* of finance, &c.

INTERCAL'ARY (*intercalarius*, that is to be inserted: *Lat.*), in Chronology, an epithet applied to the day inserted in a leap-year. The intercalary day was assigned to February because it was the shortest month. It was inserted by the ancient Romans between the 24th and 25th, a place it still retains in the ecclesiastical calendar; but in the civil, a day is added at the end of the month [See CALENDAR and BISSEXTILE.]

INTERCOLUMNIA'TION (*intercolumnium*: *Lat.*), in Architecture, the space between two columns, which is always to be proportioned to the height and diameter of the columns.

INTERCOS'TAL (*inter*, between; and *costa*, a rib: *Lat.*), in Anatomy, an appellation given to such muscles, nerves, arteries, and veins, as lie between the ribs.

IN'TERDICT (*interdictio*, a prohibiting: *Lat.*), an ecclesiastical censure, by which the church of Rome forbids the performance of divine service in a kingdom, province, town, &c. In the middle ages, it was a very formidable matter; it caused all spiritual services to cease in the kingdom against which it was issued: the churches were shut up, no sacraments except baptism were administered, corpses were buried without funeral rites, and all the functions of a church which was then believed to be the only medium of salvation ceased. In 998, Gregory V. compelled king Robert of France to dissolve his marriage with his cousin Bertha, by an interdict. England was laid under an interdict by Innocent III. in the reign of John. The last time it was tried as an instrument of intimidation was in 1809, when a powerless interdict was issued against Napoleon by Pius VII.

IN'TEREST (*intérêt*: *Fr.*), the sum of money paid or allowed, according to a fixed rate, for the loan or use of some other sum. The sum lent is called the *principal*; the sum agreed on as interest is called the *rate per cent.* Interest is distinguished into *simple* and *compound*. Simple interest is that which is paid on the sum originally lent. Compound interest is that which is paid not only upon the principal but upon arrears of unpaid interest. When interest at five per cent. is thus added to principal the accumulations equal the original sum in about fourteen years.——INTEREST, in Arithmetic, a rule by which the interest on money is computed.

INTERFE'RENCE (*inter*, between; and *fero*, I bring: *Lat.*), in Optics, certain phenomena which result from the action of rays of light upon each other. If two minute pencils of light, radiating from two different luminous points, fall on a piece of paper, &c., at the same spot, equally distant from the luminous points, a greater intensity of light is produced than by either pencil singly; also, if the length of one of the rays exceeds that of the other by some certain difference, or by some multiple of that difference, the intensity of the light thrown on the paper is similarly augmented. But if one ray is longer than the other, only to the amount of half that difference, or some multiple of the half, the two pencils will destroy each other, and a black spot or fringe will be produced. The *difference* of length required by the different coloured rays is different. This mutual action of the rays, increasing each other in one case, and destroying each other in the other, is termed interference. It is analogous to what occurs when two organ-pipes are sounded together, according as they are quite or not quite in unison; if they are quite in unison, each will increase the sound of the other; if not quite in unison, intervals of silence will be produced, instead of a continuous sound. If light is merely the *vibration* of an ethereal medium, the effects produced with the two rays of light can be explained in the same way as that with the two sounds; that is, the waves of light, like those of sound, when they correspond, augment each other, but, when they come in contact in opposite phases, neutralize each other. The ease with which the undulatory theory explains interference, and the difficulty of explaining it by the theory of emission, are considered a very strong argument in favour of the truth of the former.

INTERJEC'TION (*interjectio*, literally a throwing between; *Lat.*), in Grammar, an indeclinable part of speech, serving to express some passion or emotion of the mind; as, '*Alas!* my fondest hopes are now for ever fled.'

INTERLOC'UTORY OR'DER or DECREE' (*interlocutio*, a speaking between. *Lat.*), in Law, an order that does not decide the cause, but only some matter incident to it, which may happen in an intermediate stage.

IN'TERLUDE (*interludo*, I play between: *Lat.*), in the Drama, a light entertainment exhibited on the stage between the principal performance and the afterpiece. At present, the term *interlude* is applied principally to comic operas, written for two or three persons. In ancient tragedy, the chorus sang the interludes between the acts.

INTERLU'NIUM (*Lat.*), in Astronomy, the time in which the moon does not perceptibly change.

INTERMIT'TENT FE'VERS (*intermitto*, I leave off for a time: *Lat.*), such fevers as subside and soon return. These fevers are distinguished into various classes, according to the interval of time between the attacks; as *tertian* fever, *quartan* fever, &c.

INTERMODIL'LION (*inter*, between: *Lat.*; and *modillion*), in Architecture, the space between two modillions, which should be equal throughout the entablature.

IN'TERNODE (*inter*, between; and *nodus*, a knot: *Lat.*), in Botany, the space intervening on a branch between the leaves; or that contained between any two knots or joints of the stalk of a plant.

INTEROS'SEOUS MUS'CLES (*inter*, between; and *ossa*, the bones: *Lat.*), in Anatomy, small muscles between the metacarpal bones of the hand, invented for moving the fingers; and between the metatarsal bones of the foot, for moving the toes.

INTERPLEADER. In Law, a bill of interpleader in equity is filed by one from whom the same article or sum is claimed by two parties, with a view to ascertain the person to whom it ought to be delivered or paid. In common law courts, relief can be given against adverse claims made on sheriffs, &c., having no interest in the matter, by a judge's order, calling on a third party to maintain or relinquish his claims.

INTERPOLA'TION (*interpolatio: Lat.*), in Mathematics, that branch of analysis which treats of the methods by which, when a series of quantities succeeding each other, and formed all according to some determinate law, are given, others subjected to the same law may be interposed between them. ——In Philological criticism, the insertion of spurious passages in the writings of some ancient author.

INTERREG'NUM (*Lat.*), the time during which a throne is vacant, in elective kingdoms; for in such as are hereditary, like that of England, there is no such thing as an *interregnum*.

INTERROGA'TION (*interrogatio*, a questioning: *Lat.*), in Grammar, the character (?) denoting a question; as, 'Do you love me?' ——INTERROGATION, in Rhetoric, a figure containing a proposition in the form of a question.

INTERROG'ATORY (*interrogatorius*: *Lat.*), in Law, a question in writing, demanded of a witness in a cause, who is to answer it under the solemnity of an oath.

INTERSEC'TION (*intersectio: Lat.*), in Mathematics, the cutting of one line or plane by another; thus we say, that the mutual intersection of two planes is a right line.

INTERSTEL'LAR (*inter*, between; and *stella*, a star: *Lat.*), in Astronomy, between the stars; also, what is situated beyond the solar system.

IN'TERVAL (*intervallum*, literally the space between two palisades: *Lat.*), in Music, the difference between the number of vibrations produced by one sonorous body of a certain magnitude and texture, and the number of those produced by another of a different magnitude and texture, in the same time. The ancients divided the *intervals* into simple or uncomposite, which they called *diastems*; and composite, which they called *systems*. Modern musicians consider the *semitone* as a simple interval, and call only those composite which consist of two or more semitones.

INTES'TACY (*intestatus*, a person that has made no will: *Lat.*), in Law, the condition of one who dies without leaving a will. Freehold lands and tenements, in which he has an estate of inheritance, descend to his heir; copyhold lands, to the heir by the custom of the manor; chattels must be distributed, subject to debts, by the party who takes out letters of administration. [See ADMINISTRATION, LETTERS OF.]

INTESTINA'LIA (*intestina*, an intestine: *Lat.*), *intestinal worms*. [See ENTOZOA.]

INTES'TINES (same *deriv.*), the convoluted membranous and muscular tube, reaching from the stomach to the anus. They consist of the large and small intestines; the former including the *cæcum*, *colon*, and *rectum*; the latter, the *duodenum*, the *jejunum*, and the *ileum*. They are attached to the body by the mesentery. The inner surface of the small intestines is covered with villi, hair-like bodies formed of folds of the mucous membrane. The structure of the intestinal canal is very different in different animals.

INTONA'TION (*in*; and *tonus*, a tone: *Lat.*), in music, the act of sounding with the voice the notes of the scale, in succession, or at any intervals. To do this successfully, a good ear is almost indispensable; and the key, or, as it has been sometimes called, the *tone*, in which the piece is written, must be carefully observed.

INTRA'DOS, the interior and lower line or curve of an arch, the exterior being termed the *extrados*.

INTRAN'SITIVE (*intransitivus: Lat.*), in Grammar, an epithet for a verb which expresses actions that do not *pass over* to an object; as, I *go*, I *come*, I *sleep*, &c.

IN TRAN'SITU (*Lat.*), during the passage from one place to another.

INTRENCH'MENT, in Fortification, any temporary work that shelters a post against the attacks of an enemy.

INTRU'SION (*intrudo*, I thrust in: *Lat.*), in Law, a species of injury to freehold property, which occurs when a stranger intrudes between the death of a tenant for life or years, and the entry of the heir of a remainderman, or reversioner, expectant on the estate for life or years, who had died previous to the decease of such tenant.

INTUI'TION (*intueor*, I contemplate: *Lat.*), in Philosophy, knowledge obtained without the instrumentality of reason; the instantaneous act of the mind, in perceiving the agreement or disagreement of two ideas.

INTUSSUSCEP'TION (*intus*, within; and *susceptio*, a receiving: *Lat.*), in Anatomy, the falling of one part of an intestine into another; or the passing of one part within another, causing a duplicature of the intestine.

IN'ULIN, in Chemistry, a white and pulverulent starch-like substance, extracted from the root of the *Inula Stellenium*, or elecampane. In its chemical properties, it seems intermediate between gum and starch.

INUNDA'TION (*inundatio: Lat.*), in Agriculture, the overflowing of land from natural causes, and without the intervention of art. It is termed *irrigation* when it is the result of design and skill.

IN VAC'UO (*Lat.*), in empty space, or in space devoid of air.

INVA'LID (*invalidus*, weak: *Lat.*), a person who is maimed, wounded, or otherwise disabled. In military and naval affairs, a soldier or sailor wounded or disabled in war, and unfit for service.

INVEN'TION (*inventio*, from *invenio* I find: *Lat.*), in the Fine Arts, the production and selection of such objects as are proper to enter into the composition of a work of art.——In Poetry, it is applied to whatever the poet adds to the history of the subject. ——In Rhetoric, the finding and selecting of arguments and means of illustration.

INVER'SE PROPOR'TION (*inversus*, inverted: *Lat.*), in Arithmetic, a rule in which it depends on the question whether the first or the second term in the statement shall be the greater. When the quantity required must be larger than the given quantity of the same kind, the second term must be the greater, and *vice versâ*. This rule is used when the effect or result of any operation is *less* in proportion as the cause is *greater*, or is *greater* in proportion as the cause is *less*.

INVER'SE RA'TIO (same *deriv.*), the ratio of the reciprocals, or the ratio inverted. Thus, ⅕ : ⅙, or 6 : 5, is the inverse of the ratio 5 : 6.

INVER'SION (*inversio: Lat.*), in Arithmetic, &c., the changing antecedents into consequents in the terms of a proportion, and the contrary.——In Grammar, a change of the natural order of words.——In Music, the change of place between two notes of an interval.——In Rhetoric and Philology, the transposition of words out of their natural order. Thus, '*Mulierem fortem quis inveniet?*' for '*Quis inveniet mulierem fortem?*' There were much greater facilities for transposition in the ancient than in the modern languages, on account of the different cases, &c., being indicated by their terminations.

INVER'TEBRATES (*in*, not; and *vertebratus*, furnished with a backbone: *Lat.*), animals without vertebrae, or an internal bony skeleton; such as worms and shellfish.

INVES'TITURE (*Fr.*), in Feudal Law, the open delivery of seisin or possession. There was anciently a great variety of ceremonies used at investitures. Originally they were made by a certain form of words; afterwards, by such things as had the greatest resemblance to what was to be transferred: thus, where lands were intended to pass, a turf, &c., was delivered by the grantor to the grantee.

INVOCA'TION (*invocatio*, from *invoco*, I call upon: *Lat.*), in Poetry, an address at the beginning of a poem, in which the poet calls for the assistance of some divinity, particularly of his muse, or the deity of poetry. In the course of an epic poem several invocations may occur, particularly when anything extraordinary is to be related; but the first invocation is always the most considerable.

IN'VOICE (*in;* and *voie*, the road: *Fr.*), in Commerce, a written account of the particulars of merchandize shipped, or sent to a purchaser, factor, &c., with the value or prices and charges annexed.

INVOLU'CRUM (a covering: *Lat.*), in Botany, the name of the leaves or scales surrounding the heads of composite flowers; also the whorl of bracts at the base of the entire umbel in umbelliferous plants. This is called the general involucre; whilst that at the base of the smaller umbels is called the partial involucre or involucel. In *ferns*, the superincumbent cuticle covering the *sori*, or small heaps of reproductive granules, found growing on their fronds. In the *Equisetaceæ*, the cases of the reproductive organs.

IN'VOLUTE (*involutus*, folded in: *Lat.*), in the higher Geometry, a curve supposed to be described by the extremity of a string, unwinding itself from the arc of another curve, about which it has been lapped.

INVOLU'TION (*involutio*, a wrapping up: *Lat.*), in Arithmetic and Algebra, the raising any quantity to a given power, by multiplying it into itself the required number of times: thus, the cube or third power of 4 is obtained by multiplying 4, the root, into itself twice; as $4 \times 4 \times 4 = 64$. The index, or exponent of the power, in this case 3, tells the number of factors, each of which is equal to the quantity to be involved; and the number of multiplications to be performed is always one less than the exponent. [See INDEX.]

I'ODINE (*iödēs*, violet-coloured: *Gr.*), in Chemistry, a substance of a dark colour and a metallic lustre; when dry it fuses at 227°, and boils and evaporates at 345°, producing purple fumes, whence its name; if heated with water, it distils over at a temperature below 212°. It is a supporter of combustion; phosphorus placed in it will take fire spontaneously. It is an irritant poison, has an acrid taste, and an odour somewhat like that of chlorine: in small doses it has been found useful in certain forms of glandular disease. It is dissolved by 7000 times its weight of water, the solution being brown; it dissolves easily in alcohol and ether. Starch will detect iodine in water containing only the 400,000th part of its weight of that substance, on account of the blue tinge produced by the iodide of starch which it forms; but the liquid must be cold, as this blue substance gives a colourless solution with hot water. Its compounds are termed *iodides*. It is used chiefly in medicine and photography, and, in this country, is generally obtained from kelp.

ION'IC OR'DER, the third of the five orders of architecture; being a kind of mean between the massive and the graceful. The first idea of this order was given by the people of Ionia. Its distinguishing feature is the *volute* of its capital. In the Grecian Ionic, there are two front and two rear volutes, connected by baluster-like forms on the flanks. In the Roman Ionic, there are on each column four diagonal volutes, and an abacus with curved sides; so that it presents the same appearance from whatever side it is viewed. The Greek volute continues the fillet of the spiral along the face of the abacus; in the Roman its origin is behind the ovolo. The height of the column is about nine diameters; and the base varies in different examples. The shaft is cut with 24 flutes. In Grecian specimens, the entablature is very simple; in modern, it is sometimes greatly enriched; and the frieze is often *cushioned*—that is, presents a convex instead of a plane surface in front.

ION'IC PHILOS'OPHERS, a sect founded by Thales, a native of Miletus in Ionia, which occasioned his followers to assume the appellation of *Ionic*. Thales was succeeded by Anaximenes, his disciple; also by Diogenes of Apollonia, and Heraclitus of Ephesus. Thales considered water, and Anaximenes air, as the original material out of which all things had sprung, and into which they would ultimately be resolved. Their successors improved these doctrines, by considering any material element as a mere symbol, calculated to present more vividly to the imagination the energy of some one principle which is the ground of all vital appearances: hence they are not to be considered as *materialists*. They admitted but *one* world, which they regarded as the work of God, and animated by him as its soul. They maintained that the universe was governed by destiny; by which they meant the immutable laws of Providence. They asserted matter to be changeable, but denied that it was divisible to infinity. They believed the existence of *spirits* or *demons*, as intelligent and immortal substances. The soul, according to their doctrine, existed after it left the body; and they attributed to inanimate things a kind of torpid soul.

IPECACUAN'HA, the root of the *Cephaelis Ipecacuanha*, a small composite plant found in damp Brazilian forests. It was introduced into Europe in the 17th century, when it was much esteemed for the cure of dysenteries. Its taste is bitter and acrid; it is one of the safest and mildest emetics with which we are acquainted, and is administered as a powder, as a tincture, or infused in wine.

IRID'IUM (*iris*, the rainbow: *Gr.*), a metal discovered in 1803, which received its name from its soluble compounds presenting all the colours of the rainbow. Iridium occurs only in the ore of platinum; it is the most refractory of all the metals, is brittle, and has a white colour. No acid will attack it, but it oxidises when ignited to redness in the air. Its equivalent is 99.

I'RIS (same *deriv.*), in Anatomy, a variegated circle which surrounds the pupil of the eye. It is formed by the choroid membrane, which becomes detached from the sclerotic coat when it reaches the edge of the cornea, and forms a curtain behind it. By the dilation or contraction of the iris more or less light is admitted through the opening in front called the pupil.—In Astronomy, one of the newly discovered planets, of the group between Mars and Jupiter. Its period is about 1342 days.—In Botany, a genus of bulbous rooted plants with handsome flowers: nat. order *Iridaceæ*.

I'RON (*iren: Sax.*), a metal known from a very remote antiquity. It is of a peculiar grey colour, and very bright when polished; it is not very malleable, but is extremely ductile and tenacious. At a red heat, it is soft and pliable. Its specific gravity is 7·7; it requires the highest temperature of a wind furnace to melt it. It is attracted by the magnet. It has been found *native*, that is, in the metallic state, only in bodies of meteoric origin. Its ores are very abundant as oxides, carbonates, &c.; and in combination with earthy matters, as *clay iron stone* in the coal districts; more or less of it is found also in almost all soils; and it causes a red colour in many. It combines with carbon so as to form *steel*, and in still greater quantity so as to form *cast iron*. At a high temperature, it burns slowly in the air; but in pure oxygen, with great brilliancy and the abundant emission of sparks. The acids act energetically on iron. It readily combines with sulphur when heated. It rusts in a moist atmosphere, particularly when carbonic acid is present in abundance, oxide of iron, or carbonate, being formed. In the great ironworks, the ore, broken into small pieces, and mixed with lime or some other substance to promote its fusion, is thrown into the furnace; and baskets of charcoal or coke, in due proportion, are thrown in along with it. A part of the bottom of the furnace is filled with fuel only. This being kindled, the blast of a great bellows, or of a blowing machine, is directed on it, and soon raises the whole to a most intense heat; this melts the ore immediately above it, and the reduced metal drops down through the fuel and collects at the bottom. The rest sinks down to fill up the void left by the consumed fuel; and this, being in its turn exposed to the blast, is also reduced. More ore and fuel are supplied above, and the operation goes on till the melted metal at the bottom, increasing in quantity, rises almost to the aperture which admits the current of air; it is then let out by piercing a hole in the side of the furnace, and, being conducted to moulds, forms what are called *pigs* of cast iron. The substitution of pit-coal in 1619 for wood, in the smelting of iron, which became general in 1740, gave an extraordinary impetus to the working of this important metal. In 1740, the amount of iron produced in England and Wales was only 17,000 tons; in 1850, it was 2,000,000 tons. But, on account of the sulphur and other impurities contained in mineral coal, the metal produced with it is not so fine, nor does it answer for some purposes so well, as that obtained with wood. The use of a *hot blast* instead of cold air in blowing, the superior efficiency of which was discovered in 1827, was the greatest improvement ever effected by simple means in any manufacture. Pig iron contains from 2 to 5 per cent. of its weight of carbon. Wrought or malleable iron is nearly pure iron. It may be made either by direct reduction of the ore, or by removing the carbon and impurities from cast iron. In the latter case the principle of the processes adopted is to bring the melted iron into contact with air sufficient to oxidate the carbon and silicon. The usual plan is to stir the melted iron whilst in the furnace with a rake, and this is called *puddling*. According to Mr. Bessemer's plan, jets of air are forced through the melted iron by a blowing machine. In either case the iron on being removed from the furnace is hammered and then passed between rollers, with the view of inducing the fibrous structure which imparts strength and toughness to it. Malleable iron is distinguished from cast iron not only by having a fibrous in place of a granular or crystalline structure, but by its capability of being *welded*—that is, two pieces raised to a white heat may be pressed or hammered into such firm union that they form one piece. Great Britain is the largest iron producing country in the world, her annual production of cast iron being nearly four millions of tons.

IRON-FLINT, in Mineralogy, a sub-species of quartz, with a fracture more or less conchoidal, shining and nearly vitreous. It occurs in six-sided prisms, in small grains, and also in masses. Its varieties are red, yellow, and greenish.

IRON PYRI'TES (*purites*, from *pur*, fire: *Gr*.), *yellow sulphuret of iron*, an abundant ore of iron, containing one atom of iron, and four of oxygen; it is used chiefly for the production of sulphate of iron, or *green vitriol*, and recently for obtaining sulphur. Sulphurets of the metals were termed *pyrites*, because the yellow sulphuret of iron, to which in strictness the name should be confined, strikes fire with steel.

I'RONY (*eirōneia*, from *eirōn*, a dissembler: *Gr*.), in Rhetoric, was understood by the ancients, at first, to mean the representation of things or qualities as less than they really are; afterwards, and among the moderns, it designated the use of expressions contrary to the thoughts of the speaker. In the ordinary sense, irony means the bestowing of praise where evidently none is deserved.

IRRADIA'TION (*irradio*, I illuminate: *Lat*.), in Physics and Astronomy, the apparent enlargement of an object strongly illuminated. This is due to the impression produced by light on the retina being extended to a small distance round the focus of the rays concentrated by the crystalline lens. Irradiation causes a star to appear not a point, but a disc; and makes the bright part of the moon seem of greater diameter than the dark portion, at her first quarter.

IRRITABIL'ITY (*irritabilitas*: *Lat*.), in Physiology, a property possessed by most of the living tissues, in consequence of which motion is produced under the action of certain stimuli.

ISA'IAH, or THE PROPHECY OF ISAIAH, a canonical book of the Old Testament. Isaiah is the first of the four great prophets, the other three being Jeremiah, Ezekiel, and Daniel.

ISCHIAD'IC (*ischiadikos*, from *ischion*, the hip-joint: *Gr*.), in Medicine, an epithet for that rheumatic affection of the hip called *sciatica*.

IS'CHIUM (*ischion*, the hip-joint: *Gr*.) in Anatomy, one of the bones of the fœtal pelvis, and part of the *os innominatum* of the adult. [See INNOMINATUM OS.]

ISCHNOPHO'NIA (*ischnophōnia*: from *ischnos*, slender; and *phōnē*, a voice: *Gr*.), in Medicine, a shrillness of the voice; but more frequently an impediment or hesitation of speech.

IS'ERINE (because from *Iser*, in Bohemia), *titaniate of iron*; a mineral of an iron-black colour, and of a splendid metallic lustre, occurring in small obtuse angular grains.

I'SIAC MYS'TERIES. The worship of Isis [See OSIRIS] was transplanted from Egypt to Italy, but the rites became so licentious that they were forbidden, and Tiberius ordered the images of the goddess to be cast into the Tiber. They were however revived, and fell under the lash of Juvenal.

I'SINGLASS (*hausen-blasse*, sturgeon's bladder: *Ger*.), in Commerce, a substance, consisting of gelatine, and obtained chiefly from the sounds or air bladders of sturgeons. The sounds of fresh-water fish are to be preferred for the purpose, because these are the most transparent, flexible, and delicate; but those of the cod and ling are used by the fishermen of Newfoundland and Iceland. The coarser sorts of isinglass are made of the intestines of the fish. Good isinglass should be perfectly free from taste and smell, and quite soluble in boiling water. Isinglass boiled in milk forms a nutritious jelly, which, when flavoured, is *blanc-manger*. It is also used for fining fermented liquors, and various other purposes.

IS'LAMISM, the practical as well as the doctrinal tenets of the Mohammedan religion, embracing the whole of their civil and religious polity.

ISOCH'RONAL, or ISOCH'RONOUS, (*isochronos*: from *isos*, equal; and *chronos*, time: *Gr*.), performed in equal times. An epithet applied to the vibrations of a pendulum.

ISOLA'TION (*isola*, an island: *Ital*.), the same as *insulation*, which see.

ISOMER'IC BODIES (*isos*, equal; and *meros*, a part: *Gr*.), in Chemistry, are compounds which consist of the same elements in the same proportions, but have different properties—probably from the different way in which they are combined or grouped. Cyanic, cyanuric and fulminic acids are examples; all these being compounds of carbon, nitrogen, and oxygen in the same proportions.

ISOMET'RICAL PER'SPECTIVE (*isos*, equal; *metron*, measure: *Gr*.). There is a useful method of drawing objects whereby three sides of a parallelopiped are shown, and every part of the drawing is on the same scale, there being no diminution of distant parts as in ordinary perspective drawings. Such drawings are said to be in isometrical perspective.

ISOMOR'PHISM (*isos*, equal; and *morphē*, a form: *Gr*.). Substances which resemble each other in their crystalline forms, but differ in their elements, are *isomorphous*. Phosphate and biphosphate of soda are isomorphous with arseniate and binarseniate of soda.

ISOPERIMET'RICAL FIG'URES (*isoperimetros*, of equal circumference: *Gr*.), such as have equal perimeters or circumferences.

ISOS'CELES (*isoskeles*: from *isos*, equal; and *skelos*, a leg: *Gr*.), in Geometry, a term applied to a triangle having two equal sides.

ISOTHER'MAL (*isos*, equal; and *thermē*, heat: *Gr*.), having an equal temperature. *Isothermal lines* are those drawn on a map through places having the same annual mean temperature. Geographers, to avoid confusion, group the lines into zones or bands, which are called *isothermal zones*.

ISOTON'IC (*isotonos*, equally stretched: *Gr.*), in Music, the scale of equal temperament, in which the octave is divided into twelve equal parts or mean semitones.

IS'SUANT (issuing: *Fr.*), in Heraldry, an epithet for a lion or other beast coming out of the bottom line of any chief or fess.

IS'SUE (*Fr.*), in Law, the legitimate offspring of parents.——The point or matter *at issue* between contending parties in a suit is some fact affirmed on the one side and denied on the other.——Issue, in Medicine, an artificial vent for noxious humours in the body.

ISTH'MIAN GAMES, so called because they were celebrated in the Isthmus of Corinth, which joins the Peloponnesus to the continent. They were held at the temple of Isthmian Neptune, which was surrounded with a thick forest of pine; and the contests were of the same kind as at the Olympic games.

ISTH'MUS (*isthmos: Gr.*), in Geography, a neck or narrow strip of land which joins a peninsula to a continent, as the isthmus of Corinth; or which unites two continents, as the isthmus of Darien, that connects North and South America.

ITAL'IAN LAN'GUAGE. This beautiful and harmonious language is derived from the classical Latin, corrupted by many local dialects. The Italian differs from Latin very much as the modern differs from ancient Greek. [See Greek Language.] For a long period Italy has lost the high place she once possessed in literature; but Dante (1265—1321), Petrarch (1304—1374), Boccaccio (1313—1375), Ariosto (1474—1533), and Torquato Tasso (1544—1595) have written works which will make her language to be studied when it has ceased to be a living tongue. And amongst *dii minores* there were Pulci, Boiardo, Bernardo Tasso, Guarini Metastasio, Goldoni, and Alfieri. These were poets; but there are many celebrated names in other departments: for example, Machiavelli, Guicciardini, Benvenuto, Cellini, and Vasari, as writers of prose. Galileo was a leading pioneer in science. In painting and sculpture, it is universally admitted that the Italians have excelled all the other moderns.

ITAL'IC SCHOOL OF PHILOS'OPHY, the Pythagorean and Eleatic systems taken together. The term is, however, sometimes used to express that founded by Pythagoras; which was so called, because he taught in Italy, spreading his doctrines among the people of Tarentum, Metapontus, Heraclea, &c.

ITAL'ICS, in Printing, characters or letters (first used in Italy) which stand inclining; thus—*Italic.* They are often used by way of distinction from Roman letters, for emphasis or antithesis, or on account of some peculiar importance attached to the words in which they are employed.

I'VORY (*ivoire: Fr.*; *ebur: Lat.*), the tusk of the male elephant, a hard solid substance, of a white creamy colour, and greatly esteemed for the fineness of its grain, and the high polish it is capable of receiving. That of India becomes yellow; but that of Achem and Ceylon is free from this imperfection. Ivory is extensively used by cutlers in the manufacture of handles for knives and forks; by miniature painters for their tablets; by turners, in making numberless useful and ornamental objects, as well as for chessmen, billiard-balls, toys, &c.; also by musical and philosophical instrument-makers; by comb-makers; and by dentists for making artificial teeth, for which, however, the ivory of the walrus is preferred. Each tusk weighs, on an average, about 60 lbs.; and about 2,000 cwt. are imported each year. The western and eastern coasts of Africa, the Cape of Good Hope, Ceylon, India, and the countries to the eastward of the straits of Malacca, are the great sources whence supplies of ivory are derived. The structure of ivory is the same as that of the dentine of the human tooth. [See Dentine.]

I'VORY BLACK, the mixture of charcoal and phosphate of lime obtained by burning bone; it is very effective in depriving certain substances of their colour.

I'VY (*ifig: Sax.*), *Hedera helix*: nat. order, *Araliaceæ*, an evergreen climbing shrub, which attaches itself to other objects by aerial roots. In classical mythology this plant was sacred to Bacchus, whose head was represented as surrounded by a wreath of it.——*Ground Ivy* is a trailing perennial plant, with a blue flower, which is wild in Britain. It is the *Glechoma hederacea* of botanists: nat. order, *Labiatæ*.

J

J, when reckoned a distinct letter, as it now always is, instead of being mixed up with *i*, as formerly, in dictionaries, &c., is the tenth in the alphabet; and has a soft sound in English, like that of the *g* in *genius*: thus, *jet*. It is only within the last century that any distinction has been made between *i* and *j*. In the Spanish language, *j* represents a guttural; and is often substituted for *x*, which has the same sound.

JAC'AMAR, in Ornithology, a genus of scansorial birds, closely allied to the kingfishers, but differing from them in their feet, and in inhabiting moist places; also, their plumage is not so smooth, and always exhibits a metallic lustre. They are solitary birds, feed on insects, and build in low bushes. They were arranged by Linnæus under the genus *Alcedo*, but were placed by Cuvier in a separate genus, *Galbula*. There are several species, some of which are natives of India, but the most beautiful are met with in South America.

JA'CINTH (*jacinthe: Fr.*), the *Hyacinth*, which see.

JACK, in Mechanics, a well-known contrivance for raising weights. The ordinary *kitchen-jack* is a compound machine, in which the weight with which the spit is charged is the power applied to overcome the friction of the parts, and in which a steady and uniform motion is obtained by means of the fly.——The *smoke-jack* is moved by a fan placed horizontally in the chimney; and, being made to revolve perpetually by the draught of the fire, it requires no winding up.——JACK, in Ichthyology, a name given to a young pike.——JACK, the horse or wooden frame upon which timber is sawn; a coat of mail, and likewise the garment worn over it; the small bowl which serves as a mark at the exercise of bowling, &c.——JACK, in a ship, an ensign or flag hoisted up at the spritsail-topmast head.

JACK, or JACA TREE, the common name of an East Indian tree, the *Artocarpus integrifolia* of botanists, allied to the mulberry-tree. It produces a fruit somewhat resembling but inferior to the bread fruit, the produce of another species of *Artocarpus*.

JACK'AL (*tschakkal: Ar.*), the *Canis aureus* of zoologists, a beast of prey, resembling the fox in appearance, but the wolf in its habits. It rouses other beasts by its cry, so that they are easily taken by the lion, whence it is called the *lion's provider*. Like the vulture and hyæna, the jackal feeds upon putrefying animal substances, which it scents at a great distance, and thus it soon frees the air from the effluvium. It is a native of Asia and Africa; it breeds with the dog, and their offspring are very prolific. It is abundant in the warmer parts of India and Africa, but is not found in the New World.

JACK'DAW, the *Corvus Monedula* of ornithologists, a black bird of the crow family, well known for its mischievous habits and garrulity.

JAC'OBIN, a name given, during the revolution in France, to the more violent advocates for republican government. The appellation originated in the circumstance that the secret meetings of the party were held in a building anciently belonging to the Jacobin monks (an order of Dominicans), where they concerted measures for influencing the proceedings of the National Assembly. Hence the word *Jacobin* has been applied to any turbulent demagogue who opposes government, in a secret and unlawful manner. The *Jacobin Club* had the following origin:—Some short time after the American revolution, political societies were formed in Paris (where *bureaux d'esprit*, or associations for the discussion of literary subjects, had previously been common), in which political subjects were debated, and the members of which were almost universally inclined to republicanism. At first their true object was studiously concealed; but, gathering strength, they displayed their real intentions. Their external symbol was a red cap; but afterwards a dirty dress was the token of their *sansculottism*. The revolution proceeding rapidly, similar societies were formed in nearly all the towns of France; and thus they became enabled to direct the public opinion. In 1792, the leading club, in which sometimes more than 2,500 members convened, kept up a correspondence with more than 400 affiliated societies; and the number of Jacobins in all France was estimated at about 400,000.

JAC'OBITES (*Jacobus*, James: *Lat.*), in English History, that party which, after the revolution of 1688, adhered to James II. and his descendants. Subsequently to the death of James, they languished for a while, but then revived; and towards the close of the reign of Anne, Bolingbroke and others of her ministers were in treaty with his son regarding his return. The first Scotch rebellion broke out in 1715, after the accession of George I., but failed; the failure of the second rebellion, also, in 1745, put an end to the political existence of the party, even in Scotland; though a correspondence is said to have been kept up with Charles Edward until his death in 1787. His brother, the cardinal of York, died in 1807. According to the strict rules of hereditary descent, the house of Sardinia and some other families intervene between the House of Brunswick and the crown of England.——JACOBITES, in Church History, the name of two sects of Christians in Syria and the adjacent countries. They hold that Jesus Christ had but one nature, and they practice circumcision before baptism. Many vain attempts have been made to unite them with the Church of Rome.

JA'COB'S STAFF, the same as *cross staff*, a mathematical instrument, for taking heights and distances where much accuracy is not required.

JACO'BUS (James: *Lat.*), a gold coin belonging to the reign of James I., of the value of 25*s.*

JADE, in Mineralogy, *nephrite*, a stone remarkable for its hardness and tenacity. It consists, essentially, of silica, alumina, and magnesia. The Chinese manufacture it into various articles.

JA'GUAR, the *Leopardus onça* of zoologists, one of the Felidæ which has a body four or five feet long, with fur coloured brownish yellow, with black spots. It haunts the wooded banks of great rivers in South America. It is a voracious animal, attacking oxen, horses, and any smaller animals that come in its way, but seldom man. It roars much by night. It is usually killed by being driven by dogs up a tree, where it is despatched by bullets.

JAL'AP (from *Xalapa*, in Mexico, whence it originally came), a resin extracted from the roots of various plants belonging to the genus *Ipomœa* and other genera: nat. order, *Convolvulaceæ*. It is obtained in globular pieces of a dense and resinous texture; in powder it has a nauseous odour and taste. It is a drastic purge, but is liable to gripe and nauseate.

JAMB (*jambe*, a leg: *Fr.*), in Architecture, the side-piece or post of a door; or the side-piece of a fireplace.

JAN'IZARIES, or JAN'ISSARIES (a corruption of *yeni tscheri*, new troops: *Turk.*), the appellation given to the grand seignior's guard, or the soldiers of the Turkish infantry. The janizaries becoming turbulent, and rising in arms against the sultan in May 1826, they were attacked, defeated, and subsequently abolished; and their place was supplied by troops trained after the European manner.

JAN'SENISTS, a set of Roman Catholics in France, who followed the opinions of Jansen, bishop of Ypres, and constituted a formidable party in the latter half of the 17th century. They were Calvinists in some respects; in others they approached to the reformed opinions; but they never separated from the Romish Church. Certain doctrines extracted from their writings were condemned by the bulls of two popes. They maintained a severe contest with the Jesuits, by whom they were at last crushed. Arnauld, of the monastery of Port Royal, was one of the most eminent of the Jansenists. That monastery was suppressed by Louis XIV. in 1709.

JAN'UARY (*Januarius*, literally pertaining to Janus: *Lat.*), the first month of the year. According to some, its name was given by the Romans in honour of *Janus*, the divinity who presided over the new year and all new undertakings; but, according to others, it is derived from *janua*, a gate.

JAPAN VARNISH is the produce of a tree belonging to the genus *Rhus*: nat. ord. *Anacardiaceæ*. It seldom exceeds the height of 20 feet. From the seed, oil and wax are pressed, whilst the sap, taken from the tree in spring, yields the well known lacquer. When it first exudes on cutting the trunk, it is white and of the consistence of cream, but it soon turns black. But the common Japan varnish of Europe is composed of seedlac, resin, and spirit of wine. To this is added the colour required. After every coat, the article must be subjected to as high a temperature as may be applied without injuring it or the varnish. Figures or flowers, upon the japan, should be executed with coloured varnish; but oil, which cannot be lasting, is frequently substituted. All bodies, the substance of which is firm, may be japanned. Paper is too flexible, unless under the form of 'papier mâché.' The manufacture of japanned goods, as tea-trays, candlesticks, snuff boxes, &c., is carried on very extensively at Birmingham.

JAP'ANESE CE'DAR, The, is an evergreen coniferous tree, which reaches the height of from 80 to 100 feet in its native land. It is the *Cryptomeria japonica* of botanists: nat. ord. *Coniferæ*. It is being introduced into English shrubberies.

JAP'ANESE ME'DLAR, The, is the edible fruit of an evergreen tree called *Eriobotrya japonica* by botanists: nat. ord. *Rosaceæ*. The flower is white, the ripe fruit yellow, and somewhat resembling a plum in shape.

JARGOO'N, in Mineralogy, one of the varieties of *zircon*, found in Ceylon.

JAS'MINE (*jasmin*: *Fr.*, from *iasmê*, a fragrant perfume: *Gr.*), the name of plants belonging to the genus *Jasminum*. One species with white flowers, the *J. officinale*, thrives in this country without shelter; its flowers are highly fragrant, and afford, by distillation, an essential oil.

JAS'PER (*jaspe*: *Fr.*), in Mineralogy, a genus of stones, of the siliceous class, being a sub-species of rhomboidal quartz. It is of a complex irregular structure, of a great variety of colours, and emulates the appearance of the finer marbles or semi pellucid gems. They all readily strike fire with steel.

JAS'PI CA'MEA (*jasper*, and *cameo*), the dull, broad-zoned, green and white cameo; a very elegant species, much resembling the common cameo in all things but colour.

JAS'PONYX (*jasper*, and *onyx*), in Mineralogy, the purest horn-coloured onyx, with beautiful green zones, composed of the materials of the finest jaspers.

JAT'ROPHA, in Botany, a genus of plants: nat. ord. *Euphorbiaceæ*. [See CASSADA.]

JAUN'DICE (*jaunice*, from *jaune*, yellow: *Fr.*), a disease of which the distinguishing peculiarity is, that the skin becomes yellow. It proceeds from some affection of the liver and gall-bladder; and is often superinduced by a long continuance of melancholy and painful emotions.

JAY (*geai*: *Fr.*), the *Garrulus glandarius* of ornithologists, a handsome British bird of the crow family. Its upper wing-feathers are blue, variegated with black and white. Jays are lively, petulant, and rapid in their movements, as well as exceedingly noisy, and, like their kindred the magpie and jackdaw, they can be taught a variety of words and harsh grating sounds.

JEHO'VAH ('I am:' *Heb.*), one of the Scripture names of God, signifying the Being who is self-existent and gives existence to others. It was so venerated by the Jews that they never pronounced it, nor even fully wrote it. When reading the Scriptures, they used the word *Adonai* (Lord) wherever it occurred. [See ELOHIM.]

JEL'LY (*gelée*: *Fr.*). [See GELATINE.]

JERKED BEEF, or CHARQUE, an article of large consumption in Brazil, Cuba, and other places. Its preparation is chiefly carried on in Chili and Buenos Ayres during the dry summer months. The meat is cut up in thin slices without bones or fat, and thoroughly dried on hurdles in the sun. The slices are then made up into bundles, and sewed up in hides.

JERU'SALEM A'RTICHOKE. [See ARTICHOKE.]

JESS'ED, in Heraldry, an epithet for a hawk or falcon having the jesses or straps of leather, which were used for tying the bells on its legs, and which are generally of a different tincture.

JES'UITS, or the SOCIETY OF JESUS, a

political and religious order in the Roman Catholic church, corresponding with a chief at Rome, was instituted by Ignatius Loyola, A.D. 1540. It is a religious body, with a military constitution. Its superior is called its general, and his government is despotic. Unlike other communities of monks, the duties of this are to be performed in active life. Its ostensible aim is to rectify every disorder in society; and the means by which this is to be effected is the possession of unlimited power. No other religious order affords a parallel to this; for, while those who give themselves only to devotion and religious contemplation present few distinguishing traits, the Society of Jesus early raised itself to a degree of historical importance unparalleled in its kind. Their privileges and immunities were almost unbounded; and they were exempt from all episcopal and civil jurisdiction and taxes, so that they acknowledged no authority but that of the pope and the superiors of their order. It was expelled from England in 1604; from Venice in 1606; Portugal in 1759; France in 1764; Spain and Italy in 1767, and was suppressed by Clement XIV. in 1773 The order has, however, since been restored.

JET, a solid, opaque, inflammable substance, found in large detached masses, of a fine and regular structure, having a grain like that of wood, splitting more easily in one direction than in any other, and taking a good polish It is very light, moderately hard, and not fusible; but it is readily inflammable, and burns a long time with a fine greenish flame It attracts light substances when rubbed, becoming electric, like amber; hence it has been called *black amber*. It is frequently used for ornamental purposes, buttons, bracelets, snuff boxes, &c. Mineralogists consider jet to be a variety of lignite, and, therefore, to be of vegetable origin.

JET D'EAU (*Fr.*), a fountain which throws water up into the air. When the jet is slightly inclined it throws the water to a greater height than when it is perpendicular, but the effect which it produces is not nearly so pleasing.

JEU D'ESPRIT (*Fr.*), a witty saying.

JEWS, the descendants of Abraham, once an independent tribe in Palestine, but dispersed by the Romans. They are still distinguished by their religion, peculiar pursuits, and primitive customs; but have lost the distinction of twelve tribes, though perhaps more numerous than at any period. [See JUDAISM.] They are the negotiators of money between all nations, and are everywhere remarkable for their successful enterprise and accumulation of wealth.

JEW'S'-HARP (*jaw's harp*, from the place where it is played), an instrument of music, of a very imperfect character. It is placed between the teeth, and, by means of a spring struck by the finger, gives a sound that is modulated by the breath.

JEW'S'-STONE, the fossil spine of a very large egg-shaped sea-urchin. Its colour is a pale dusky grey, with a tinge of red.

JIB, the foremost sail of a ship, extended from the outer end of the *jib-boom* towards the foretopmast-head. In sloops, it is on the bowsprit, and extends towards the lower mast-head. Beyond the jib-boom is sometimes extended the *flying jib-boom*.

JIG'GER, in a ship, a rope about five feet long, with a block at one end and a sheave at the other, it is used to hold on the cable when it is heaved into the ship by the windlass.

JOB, or THE BOOK OF JOB, a canonical book of the Old Testament, containing the narrative of a series of calamities which happened to a man named Job, as a trial of his patience and fortitude; together with conferences which he held with his several friends on the subject of his misfortunes; and the manner in which he was restored to happiness. Many of the Jewish Rabbins hold that this relation is purely a fiction; others think it a simple narrative of a matter of fact; while a third class of critics acknowledge that the groundwork of the story is true, but that it is written in a poetical style, and decorated with peculiar circumstances, to render the narration more profitable and interesting.

JOIN'ER (*joindre*, to join: *Fr.*), a mechanic who fits together the several pieces of wood which have been prepared for each other. He differs from the carpenter, inasmuch as he does the finer work, that requires more skill.

JOINT (*Fr.*), in Anatomy, the place where any bone is articulated or joined with another.——JOINT, in Botany, the knot in the stalk of a plant.——JOINT, in Joinery, the parts where two pieces of wood are united. ——JOINT, in Masonry, the separation between the stones, which is filled with mortar.

JOINT-STOCK COM'PANIES, commercial associations, having a stock or fund formed by the union of contributions from different persons. [See COMPANY.]

JOINT TEN'ANCY (*joint-tenancier*, a joined-tenant: *Fr.*), in Law, an estate vested in two or more persons created at the same time, each having the same interest and title. It is subject to the right of survivorship; and may be severed by partition, or by the alienation of any party. Personal chattels may be the subject of joint tenancy.

JOIN'TURE (*Fr.*), in Law, the annuity payable to a widow out of her husband's estate, either under his will or by virtue of her marriage settlement

JO'NAH, PROPHECY OF, a canonical book of the Old Testament, in which it is related that Jonah was commanded by God to go and prophesy the destruction of the Ninevites, on account of their wickedness. Instead of obeying the divine command, he embarked for Tarshish; but a tempest arising, the mariners drew lots to determine who was the cause of it; and the lot falling on him, he was thrown into the sea. Being swallowed by a great fish, he was, after three days, cast on the shore; and boldly preaching to the people of Nineveh, he predicted their destruction, which, however, on account of their repentance, was averted. Jonah, dreading the suspicion which might attach to him as a false prophet, retired to a mountain at a distance from the city, where he learnt the folly and unreasonableness of his own discontent. It may be observed that some critics consider this book as a number of traditions, collected after the destruction of Nineveh; while others treat it as a mere allegorical poem.

JON'GLEURS, an old French word derived from the Latin *Joculatores*, the name given to the buffoons of the time of the Troubadours. They stationed themselves at cross roads, in grotesque dresses, and drew a crowd around them by the exhibition of dancing monkeys and the performance of legerdemain feats, accompanied by ridiculous antics and grimaces. They thus prepared the bystanders for the verses they recited. Troubadours were frequently introduced at a princely court, under the name of Jongleurs In this word we see the origin of our Jugglers.

JON'QUIL (*jonquille* · *Fr.*), a plant of the genus *Narcissus*, the flowers of which are either single or double, and are much esteemed for their sweet scent.

JOSH'UA, a canonical book of the Old Testament, containing a history of the wars and transactions of the person whose name it bears. It is divisible into three parts, the first of which is a history of the conquest of Canaan; the second, which begins with the 12th chapter, is a description of that country, and the division of it among the tribes; and the third, comprised in the last two chapters, contains the renewal of the covenant which he caused the Israelites to make, and the death of their victorious leader.

JOUR'NAL (*giornale*: *Ital.*; from *diurnale*, belonging to a day: *Lat*), any book in which is kept an account of what passes from day to day. It is often applied to a periodical publication.——In Navigation, a book in which is kept an account of the ship's course, winds, weather, &c.

JU'BILEE (*jubilo*, I shout: *Lat.*), a grand festival celebrated every forty-ninth or fiftieth year—it is not certain which—by the Jews, in commemoration of their deliverance out of Egypt. At this festival, which was a season of joy, all debts were to be cancelled; all bond-servants were set free; all slaves or captives were released; and all estates which had been sold reverted to the original proprietors or their descendants.——In imitation of the Jewish jubilee, the Roman Catholic church instituted a year of jubilee, during which the popes grant plenary indulgences, &c. It was first established by Boniface VIII., who proclaimed a general indulgence to all Christians who should visit the tombs of the apostles, at Rome, in the year 1300; and was intended to be celebrated only every hundredth year; but it was found so gainful, that Clement VI. reduced the interval to fifty years; on which occasion it received the name of jubilee, as it thus acquired some resemblance to the Jewish festival of that name. In 1389, Urban V. reduced the term to thirty-three years; but it was raised again, by Nicholas V., to fifty; and finally, in 1470, was settled at twenty-five, by Paul II. It begins on Christmas-day, by the pope opening with great solemnity a door in the church of St. Peter's, which is walled up at every other time.

JU'DAISM, the religious doctrines and rites of the Jews, a people of Judah, or Judea. These doctrines and rites are detailed in the five books of Moses, hence called *the Law*. The *Caraites* acknowledge no other code; but the *Rabbinists*, one of the two sects into which the Jews are divided, add those precepts inculcated by the *Talmud*. The following is a summary of the religious creed of the Jews:—1, that God is a creator and active supporter of all things; 2, that God is ONE, and eternally unchangeable; 3, that God is incorporeal, and cannot have any material properties; 4, that God shall eternally subsist; 5, that God is alone to be worshipped; 6, that whatever has been taught by the prophets is true; 7, that Moses is the head and father of all contemporary doctors, and of all those who lived before and shall live after him; 8, that the law was given by Moses; 9, that the law shall always exist, and never be altered; 10, that God knows all the thoughts and actions of man; 11, that God will reward the observance and punish the breach of his law; 12, that the Messiah is to come, though he tarry a long time; and 13, that there shall be a resurrection of the dead when God shall think fit. These doctrines, commonly received by the Jews to this day, were drawn up about the end of the 11th century by the famous Jewish rabbi Maimonides.

JUDGE (*judex*: *Lat.*). In the superior courts of common law in England there are fifteen judges, viz.:– the Lord Chief Justice of the King's (or Queen's) Bench; the Lord Chief Justice of the Common Pleas; the Lord Chief Baron of the Exchequer; the four Puisne or inferior Judges of the two first courts; and the four Puisne Barons of the latter court. The salary of the Chief Justice of the King's (or Queen's) Bench is 8,000*l.*; that of the other Chief Justices 7,000*l*; and that of the Puisne Judges, 5,000*l.* The Chief Justices are installed or placed on the bench by the Lord Chancellor, and the Puisne Judges by the Lord Chancellor and the Chief Justices. The Judges of the Court of Chancery consist of the Lord Chancellor, the Master of the Rolls, the two Lords Justices, and three Vice-Chancellors.

JUDG'ES, THE BOOK OF, a canonical book of the Old Testament, so called from its relating the state of the Israelites under the administration of many illustrious persons who were called judges, from the circumstance of their being both the civil and military governors of the people. The power of the judges extended to affairs of peace and war. They were protectors of the laws, defenders of religion, and avengers of all crimes; but they could make no laws, and impose no new burdens upon the people. They lived without pomp or retinue, unless their own fortunes enabled them to do it; for the revenues of their office consisted in voluntary presents from the people. Their administration continued from the death of Joshua till the beginning of the reign of Saul.

JUDG'MENT (*jugement: Fr.*), in Law, the sentence or doom pronounced in any cause, civil or criminal, by the judge or court by which it is tried. Judgments are either *interlocutory*, that is, given in the middle of a cause on some intermediate point, or *final*, so as to put an end to the action.——In Metaphysics, a faculty of the soul, by which it compares ideas, and perceives their agreement or disagreement.

JUDI'CIUM DE'I (the judgment of God: *Lat.*), a term formerly used to express all extraordinary trials regarding accusations which were incapable of proof or disproof by ordinary means: such as those of arms, ordeals, &c. It was supposed that God would, in such cases, specially interfere to clear the innocent and confound the guilty.

JU'GULAR FINS (*jugulum*, the throat, *Lat.*), in Ichthyology, when the ventral fins are placed on the throat before the pectoral fins they are called jugular, as in the cod and whiting.

JU'GULAR VEINS (same *deriv.*), in Anatomy, veins which run from the head down the sides of the neck, and are divided, from their situation, into *external* or superficial, and *internal* or deep-seated. By their union with the *subclavian* vein, they form the superior *vena cava*, which ends in the superior portion of the right auricle of the heart.

JU'JUBE (*Fr.*), a half-dried fruit of the plum kind, about the size and shape of an olive, the produce of the *Rhamnus Zizyphus* of Linnæus. Jujubes, when in perfection, have an agreeable sweet taste; in the southern parts of Europe, where they are common, they constitute an article of food in their fresh state; but they are medicinal when half dried.

JU'LIAN PE'RIOD, in Chronology, a revolution of 7980 years; which arises from multiplying 28, 19, and 15—that is, the solar cycle, the lunar cycle, and the cycle of indiction—into one another. This period is of great use, as the standard and general receptacle of all other epochas, periods, and cycles; and had historians remarked the number of each cycle corresponding to each year, there could have been no dispute about the time of any action or event in past ages.—When the Christian era commenced, 4,713 years of the Julian period were elapsed; 4,713, therefore, being added to the year of our Lord, will give the year of the Julian period. When the corresponding year of the Julian period is required for any year before Christ, subtract the year before Christ from 4,714, and the remainder is the required number.

JULY', the seventh month of the year. It was the fifth month of the old Roman year, and was known at first by the name of *Quintilis*. It received the name of July in compliment to Julius Cæsar, who reformed the calendar, placing this month, as it is at present, the seventh in order.

JUNCA'CEÆ (*juncus*, a rush, *Lat.*), a nat. order of herbs, including the common rushes.

JUNE, the sixth month of the year, and that in which is the summer solstice. It was the fourth month of the old Roman year, but the sixth of the year as reformed by Julius Cæsar. Some suppose it received its name in honour of Junius Brutus.

JU'NIPER-TREE (*juniperus: Lat.*), the *Juniperus communis*, the berries of which are considered as stomachic, carminative, and diuretic. The oil obtained from them is employed to flavour Hollands gin.——*Juniperus Sabina*, or savin, is a powerful and active medicine; but its heating qualities render it hurtful, unless used with the greatest caution.——*Juniperus Bermudiana* is the pencil cedar, a tree growing at the Bermudas.——*Juniperus Virginiana*, the red cedar of North America, yields a rubefacient oil. The Junipers belong to the order of *Coniferæ*.

JU'PITER, in Astronomy, the largest of the planets, and the most brilliant, excepting Venus. Jupiter revolves about the sun at the distance of 490 millions of miles from that body, and his periodical revolution is estimated at 4,332 days 14 hours 2 min. 8½ secs., or about twelve of our years. His mean diameter is 87,000 miles, his bulk 1,300 times greater than that of our globe, and the length of his day and night is equal to somewhat less than ten of our hours. It has therefore been calculated that this planet moves in its orbit at the rate of 26,000 miles in an hour; its equatorial parts, therefore, are carried round 26 times faster than the similar parts of our earth. Jupiter is surrounded with what are called by us his zones or belts, but which have been supposed to be clouds. His axis is so nearly perpendicular to the plane of his orbit that he has little change of seasons, the obliquity being only 1° 18′ 5″ at the beginning of the present century, and it undergoes a diminution of about the fourth of a second in a year. The difference in the length of his polar and equatorial diameters is equal to about 6,000 miles, the former being to the latter as 14 to 15. This is evidently occasioned by the quick motion round his axis. His density is very nearly the same as that of the sun, or about one-fourth of the mean density of the earth. Four satellites revolve about Jupiter; they are frequently eclipsed in the shadow of their primary, or hidden behind his body; and the great use made of these eclipses by geographers and navigators has occasioned them to be very carefully observed.

JURISCONSUL'T (*juris consultus*, skilled in the law: *Lat.*), a class of Roman lawyers, denoted by the abbreviation *ictus*; they very probably confined themselves to the giving of opinions.

JURISDIC'TION (*jurisdictio: Lat.*), in its most general sense, the power to make, declare, or apply the law; when confined to judiciary department, it is what we denominate the *judicial power*, the right of administering justice through the laws.

JURISPRU'DENCE (*juris-prudentia: Lat.*), the science concerned with the exposition of the principles of laws, excluding from this term the laws of God, the rules of morality, and those general expressions of fact which are only laws in a metaphorical or figurative sense. A law properly so called is a command given by political superiors to political inferiors, obliging the latter to pursue a certain course of conduct. General or comparative jurisprudence, the philosophy of positive law, is to be distinguished on the one hand from national or particular jurisprudence, and on the other from the science of legislation, being concerned with the principles on which the systems of law in civilized communities are built, and with the notions and distinctions common to such systems.

JU'RY (*juré*, sworn: *Fr.*), in Law, a certain number of persons sworn to decide justly on the matter before them. The origin of the trial by jury has been traced back to a very early period in British history, and seems, indeed, in some form, to have been used from the earliest times. The constitution of England, in committing the administration of justice to the hands of juries, has subjected them to no restraint that can prevent the free discharge of their duty. All questions of fact are submitted to the jury, questions of law being reserved for the decision of the court. A juror, in giving his verdict, is to be governed by nothing but his own opinion. The jury may find, under certain circumstances, a *special* verdict—that is, one in which the facts of the case are specially stated, and which leaves it to the court to apply the law; or they may find a *general* verdict, subject to a special case, as to a point of law. Juries are of several kinds; among these, there are, in the polity of Britain, *grand* and *petty* juries in criminal cases, and *common* and *special* juries in civil.——The *Grand Jury* consists of a body of men of some consideration in their county: they are summoned by the sheriff for every session of the peace, every commission of oyer and terminer, and of general gaol delivery; and to them all indictments are preferred. The grand jury must consist of twelve persons at least, and not more than twenty-three; that twelve may be a majority. The members are instructed in the articles of their enquiry, by the judge or justice who presides on the bench. They then withdraw, to sit and receive indictments; and they are only to hear evidence on the part of the prosecution: for the finding an indictment is merely in the nature of an enquiry or accusation, which is afterwards to be tried and determined; and the grand jury are only to ascertain whether or not there be sufficient cause to call upon the party to answer it. Formerly, the grand jury used to endorse their decision upon the indictment, in Latin; but now, they write upon an indictment which they reject, either the words 'Not a true bill,' or 'Not found,' and upon one of the truth of which they are satisfied, 'A true bill.'——The *Petit* or *Petty Jury* consists of twelve persons, and no more: it is for the trial of all criminal offences, and of all issues of fact in civil cases of the common law. The qualifications of petty jurors do not differ, generally, from those necessary for grand jurors: their duties being equally important, and demanding equal intelligence.——*A Special Jury* is composed of persons of a higher rank, such as merchants, bankers, and landowners. They are summoned only at the instance of one of the parties. When the cause is called for trial, if all the jurors do not appear, or if any of them are justly objected to and set aside, either party may pray a *tales*. That is, the deficiency may be supplied from among the bystanders, having suitable qualifications: which is called taking jurors *de talibus circumstantibus* (from similar men among the bystanders): from which circumstance, the persons thus selected are called *talesmen*. Formerly, questions of fact could not be decided in the Court of Chancery through the instrumentality of a jury, but by recent Acts of Parliament juries may now be summoned and questions of fact tried by a judge of that court in the same way as in a court of common law.

JU'RY-MAST, a temporary or occasional mast, used in the place of the foremast or mainmast, which has been destroyed by a storm.

JUS DIVI'NUM (divine law), that law which is made known by a revelation.——JUS GENTIUM, the law of nations, or the laws established between different kingdoms and states, in relation to each other.——JUS HÆREDITATIS, the right or law of inheritance.——JUS PATRONATŪS, in the canon law, the right of presenting to a benefice; or a kind of commission granted by the bishop to enquire who is the rightful patron of a church.——JUS POSSESSIONIS, the right of seisin or possession, as *jus proprietatis* is the right of ownership of lands, &c.——JUS IMAGINUM, in Antiquity, the right of using pictures and statues, similar to the modern right of bearing coats of arms: it was allowed to none but those whose ancestors or themselves had borne some curule office.——JUS QUIRITIUM, the fullest enjoyment of Roman citizenship. This was also called *jus civile* and *jus urbanum*.

JUS'TICE (*justitia*: *Lat.*) is either distributive or commutative. *Distributive* justice belongs to magistrates or rulers; and consists in dispensing to every man that which the laws and the principles of equity require. *Commutative* justice consists in fair dealing in trade, and other mutual intercourse between man and man.

JUS'TICE OF THE PEACE, a magistrate, appointed by royal commission to keep the peace of the county or borough in which he resides. On the commission of grave offences the preliminary enquiry is usually made before a justice; who may either dismiss the person charged or commit him for trial. Many statutes have empowered justices to act judicially in numerous minor matters. The court of quarter sessions in counties and boroughs is composed of the justices in the commission of the peace.

JUSTI'CIARY, or COURT OF JUSTICIARY, in Scotland, a court of supreme jurisdiction in all criminal cases. No appeal is competent to the House of Lords from this court.

JUSTIFICA'TION (*justus*, just; and *facio*, I make: *Lat.*), in Law, the showing good reason, in a court, why one has done that for which he is called to answer. *Pleas in justification* must set forth some special matter: thus, on being sued for a trespass, a person may justify it by proving that the land is his own freehold; that he entered a house in order to apprehend a felon, or, by virtue of a warrant, to levy a forfeiture, or in order to take a distress.

JUTE, a fibre largely imported into this country for the purpose of manufacture, is obtained from the inner bark of an East Indian tree, the *Corchorus capsularis*, which belongs, like our lime tree, to the nat. order *Tiliaceæ*.

JUTES, the people of Jutland, some of whom, it is traditionally said, formed colonies in Kent and the Isle of Wight under Hengist and Horsa, who landed in the Isle of Thanet in A.D. 449.

K

K, the eleventh letter of the alphabet, is usually denominated a guttural, but it is more properly a *palatal*, being formed by pressing the root of the tongue against the upper part of the mouth, with a depression of the lower jaw and opening of the teeth. It has the hard sound of *c* before *e* and *i*, where, according to the English analogy, *c* would be soft, as in the words *kept* and *king*; it is seldom found at the end of words except in monosyllables, as *clock*, *back*, *&c.*; being generally omitted where it was formerly used, as in *music*, *public*, &c. It is introduced between a vowel and the silent *e* final, as *choke*, *broke*, *&c.* Before *n* the *k* is silent, as in *knife*, *knee*. It is borrowed from the Greek *kappa*, and was very little used among the Latins, perhaps never but in words borrowed from the Greek language. It was often employed by the Romans, instead of *c*, as an abbreviation: thus K. T. for *capite tonsus*. We use it as an abbreviation for Knight; as K C B *Knight Commander of the Bath*. As a numeral the Romans used it for 250, and, with a stroke over it, for 250,000.

KAABA, the name given by Mahommedans to the holy house at Mecca, which is thought to have been originally built by angels in Paradise. In its wall is a black stone, probably of meteoric origin, which is said to have been brought by the angel Gabriel from Paradise, and to this great respect is paid.

KALEI'DOSCOPE (*kalos*, beautiful; *eidos*, form; and *skopeo*, I examine: *Gr.*), an optical instrument for presenting to the eye an ever-varying succession of splendid tints and symmetrical forms. It was invented by Sir D. Brewster; and is chiefly used by calico-printers, potters, and carpet-manufacturers, who are thus supplied with an endless variety of patterns. It is now sold as a common toy. It consists of a tube, containing two reflecting surfaces inclined to each other at any angle which is an aliquot part of 360°. The eye-glass placed immediately against one end of the mirrors, as well as another glass similarly situated at their other end, are of common transparent glass; the tube is continued a little beyond this second glass, and, at its termination is closed by a ground glass, which can be put on and off. In the vacant space thus formed are placed beads, pieces of coloured glass, and other small bright objects; and the changes produced in their positions by turning the tube give rise to the different figures.

KA'LI (the ashes of vegetable substances: *Arab.*), the *Salsola Kali*, or glasswort, a shore plant, from which the *alkali* of commerce was formerly procured by burning.

KAL'MIA, in Botany, a beautiful North American genus of shrubs, called laurel, ivy-bush, calico-bush, &c., having cup-shaped flowers, of a fine rose or purple colour, disposed in large corymbs. It is naturally allied to *Rhododendron*. The wood is very hard, susceptible of a fine polish, and resembles box.

KAMPTU'LICON, a compound of gutta-percha, caoutchouc, and ground cork, intimately mixed and subjected to great pressure. It is chiefly used for covering floors, for which purpose it possesses the advantages of being unaffected by damp, being a non-conductor of heat, and a deadener of sound.

KAM'SIN, the name given to a hot and dry southerly wind, common in Egypt and the deserts of Africa, which prevails more or less for fifty days. On the approach of this wind the sky becomes dark and heavy, the air grey and thick, and filled with a dust so subtle that it penetrates everywhere. It is not remarkably hot at first, but its temperature increases the longer it continues, and while it lasts causes a difficulty of breathing, which, when at its highest pitch, sometimes ends in suffocation.

KANGAROO', the name of some Australian animals belonging to the genus *Macropus*. The limbs are strangely disproportioned, the fore legs being small and short, whilst the hinder are long and powerful. The largest species, *M. Major*, is four or five feet in length, with a tail three feet; its usual position is standing on its hind feet, its fore feet being employed like a pair of hands. It lives on vegetables, and, instead of walking, takes leaps of about fifteen feet. It is furnished, like the opossum, with a pouch in the abdomen, which is a receptacle for its young, and is resorted to after they become strong for the sake of warmth and protection. They use their tails and hinder feet as weapons of defence. When they are pursued and overtaken by dogs they turn, and, seizing them with their fore feet, strike them violently with their hinder limbs, thereby often destroying them. The flesh of these animals is said to be nutritious and savoury, somewhat resembling mutton.

KAN'TIAN PHILOS'OPHY, called also *Critical Philosophy*, a system invented by Kant, professor of philosophy in the university of Königsberg, during the latter half of the last century. He divides the speculative portion of our nature into three provinces, *sense, understanding*, and *reason.* Our senses tell us only what things appear to be, not what they are or are not. Experience requires time and space. The truth of the fundamental axioms of geometry rests on our intuitions of space, in its three dimensions—intuitions not derived from sense, but the ground of all our experience. The understanding combines and classifies the materials yielded by sense; and its operations are generalized into four categories: *quantity*, including unity, multeity, and totality; *quality*, divided into reality, negation, and limitation; *relation*, that is, substance and accident, cause and effect, action and reaction; and *modality*, subdivided into possibility, existence, and necessity. These are the moulds in which the rude material is shaped into conception, and becomes knowledge. The categories are the subject-matter of logic. Reason consists in the power of forming ideas, which regulate, but can never constitute, science. The reason strives perpetually after the existence of God, immortality, &c., but it can decide nothing about them. The *moral faculty*, or practical reason, supplies the deficiencies of speculative reason; but it determines not what is, but what ought to be: the speculative reason gives the *form* of our *knowledge*, the practical prescribes the *form* of our *action.* Obligation is not merely a feeling: it is a pure form, under which the reason is obliged to regard human conduct. The personality of man, which lies at the ground of speculative knowledge, becomes, in relation to action, freedom of the will. The only valid foundations of belief in God, the immortality of the soul, and a future state, in which the demands of the practical reason shall be realized, are to be sought for in our moral nature.

KA'OLIN, the Chinese name for porcelain clay, which consists essentially of silica and a smaller quantity of alumina, and is derived from the decomposition of the felspar of granitic rocks. It is found in vast quantities in Cornwall.

KAR'PHOLITE (*karphos*, any small dry body—a fruit; and *lithos*, a stone: *Gr.*), a mineral, of a fibrous structure and a yellow colour. It is a hydrated silicate of alumina and manganese.

KARROO, the name given at the Cape of Good Hope to large tracts of ground composed of sand mixed with clay containing particles of iron, which give it a yellow colour. The Great Karroo, in the middle of the colony, is a tract nearly 300 miles long by from 80 to 100 miles broad, and having an elevation of 3,000 feet.

KAVAGS, an armed Turkish constable.

KAWA or AVA, the native name of a plant (*Macropiper methysticum*), nat. ord. *Piperaceæ*, grown in Polynesia for the sake of its juice, from which is prepared an intoxicating beverage, having peculiar effects. 'The taste is sweet and agreeable, producing a glow in the stomach. It induces a sort of intoxication widely different from the form that alcoholic inebriation assumes. Men under the influence of Kawa neither stagger about, nor speak thick and loud A sort of shiver affects the whole frame, the gait becomes listless and slow, but they never lose consciousness. At last great weakness is felt in all the joints; headache and an irresistible inclination to sleep intervene, and a state of complete repose becomes an absolute necessity. Inveterate drinkers are haggard and melancholy, their eyes are sunken, their teeth of a bright yellow colour, the skin dry and chopped, and the body covered with boils.'—*Voyage of the Novara.* In preparing the beverage the root is chewed in the mouth, and when changed into little cones held together by saliva they are mingled with water in a wooden vessel and gently squeezed by the hand. It is drunk out of the half of a cocoa-nut shell. Chemists have discovered a peculiar alkaloid in the root, which has been named Kawaine.

KECK'LING, among seamen, winding or twining small ropes about a cable or bolt-rope, to save them from galling.

KEDGE or KEDG'ER (*kaghe*, a small vessel: *Dut.*), a small anchor used to keep a ship steady when riding in a harbour or river.——KEDGING, furling the sails, and letting a ship drift with the tide, when the wind is contrary to it.

KEEL (*koilos*, hollow, a term specially applied to ships: *Gr.*), the lowest piece of timber in a ship, running her whole length from the lower part of her stem to the lower part of her stern-post, and supporting the whole frame. Sometimes a second keel, or *false keel*, as it is called, is put under the first.——KEEL or *Carina*, in Botany, the lower part of a papilionaceous corolla, enclosing the stamens and pistil. It consists of two petals more or less united into a form which has suggested its name.——A leaf is said to be *keeled* when it has a longitudinal prominence on the back.

KEEL'-HAULING, among seamen, a punishment formerly inflicted on offenders at sea, by letting them down from the yard-arm with ropes, and drawing them under the keel from one side to the other.

KEEL'AGE, the duty paid by a ship on coming into port.

KEEL'SON or KEL'SON, in Naval Architecture, the inside keel; a principal timber in a ship, laid withinside across all the timbers over the keel, and fastened with long bolts, so as to form the interior or counterpart of the keel.

KEEP (*kepan*, to keep: *Ang. Sax.*), a strong tower in old castles, into which the besieged retreated in cases of extremity It is also called the *donjon* or *dungeon.*

KEEP'ER (same *deriv.*), a title given to various official persons, as, the *keeper of the great seal*, a lord by his office, and one of the privy council, through whose hands pass all charters, commissions, and grants of the sovereign under the great seal; the *keeper of the privy seal*, through whose hands pass all charters, &c., before they come to the great seal. There are also other official persons bearing the title of *keeper*.

KEEP'ING (same *deriv.*), a term used in various branches of the *fine arts*, to denote the just proportion and relation of the various parts.——In Painting, it signifies the peculiar management of colouring and *chiaro oscuro*, so as to produce a proper degree of *rilievo* in different objects, according to their relative position and importance. If the lights, shadows, and half-tints be not in proper *keeping*, that is, in their exact relative proportion of depths, no rotundity can be effected; and without due opposition of light, shade, and colours, no apparent separation of objects can take place.

KELP, the calcined ashes of marine plants from which soda was formerly obtained. Since the alkali required for manufacturing purposes can now be obtained more cheaply from common salt, sea-weed is consumed as manure, except what is required for the obtaining of iodine.

KEP'LER'S LAWS, in Astronomy, those laws which govern the planetary motions. They were first discovered and demonstrated by Kepler, and are three in number:—1. The planets describe ellipses, each of which has one of its foci in the sun. 2. Every planet moves, so that the line drawn from it to the sun describes about the sun areas proportional to the times. 3. The squares of the times of the revolutions of the planets are as the cubes of their mean distances from the sun.

KER'MES (a little worm: *Arab.*), species of the genus *Coccus* of entomologists, found in the excrescences of oak-trees, growing in the south of Europe. It is an article extensively used in dyeing, and is inferior to nothing but cochineal as a means of producing scarlet. *Kermes-grains*, as they are called, are the dried bodies of the female insects of the species *Coccus Ilicis*, which lives upon the leaves of the *Quercus Ilex*, or prickly oak. It was formerly called *Vermiculus*, whence the French *vermillion*. Kermes has been employed from time immemorial in India to dye silk; and was also used by the ancient Greeks and Romans for the same purpose; but since the introduction of cochineal, it has become an object of comparatively trifling importance. ——KERMES MINERAL, a name given, on account of its red colour, to the sulphuret of antimony.

KES'TREL, the *Falco Tinnunculus*, a British bird with yellow legs, a brown back, a spotted breast, and a rounded tail, broad towards the end. It is about the size of a pigeon, and very bold. It builds in hollow oaks, and feeds on quails and other small birds.

KETCH (*caicchio*: *Ital.*), a vessel with a main and mizen mast, usually from 100 to 250 tons burden. Ketches are generally used as yachts, or as bomb-vessels; the latter, which are built remarkably strong, are furnished with all the apparatus necessary for carrying on a vigorous bombardment.

KETCH'UP or **CATS'UP**, a sauce prepared from mushrooms.

KEY (*cæge*: *Sax.*), in Architecture, a piece of wood let into the back of another in a direction contrary to the grain, to prevent warping.——In Music, the fundamental note or tone, to which the whole piece is accommodated, and in which it usually begins and always ends. There are but two species of keys: one of the major and one of the minor mode, all the keys in which we employ sharps or flats being deduced from the natural keys of C major and A minor, of which they are mere transpositions.——The *keys* of an organ or pianoforte are moveable projecting levers, made of ivory or wood, so placed as conveniently to receive the fingers of the performer, by which the mechanism is set in motion, and the sounds produced. The whole together form the *keyboard* or *clavier*.

KEY'-STONE, in Architecture, the last or middle stone placed on the top of the arch or vault.

KHA'LIF. [See CALIPH.]

KHAN, an Asiatic governor. In the north of Asia, this title expresses the full regal dignity; but there are also *khans* of provinces, cities, &c.——KHAN, a word used by us to signify an eastern *caravansera*, in which travellers receive a gratuitous lodging for one night.

KID'NAPPING (*kind*, a child: *Dut.*; and *nap* or *nab*), the forcible seizing and taking away a man, woman, or child, in order to carry them abroad. The offence is felony. Masters of vessels leaving any of their men in other countries against their will are punishable. The taking away or detaining any child under ten years of age, with intent to deprive the parents or guardians of the possession of such child, or with intent to steal any article on its person, is punishable with penal servitude of not more than seven nor less than three years, or imprisonment, with or without hard labour, for not more than two years; and also, if a male, with a whipping, if the court think fit.

KID'NEY-BEAN, a garden pulse, so named from its resembling a kidney in shape; it has a papilionaceous flower, the pistil of which becomes a long pod, that is eaten before the seeds are fully formed. There are several species belonging to the leguminous genus *Phaseolus*.

KID'NEYS, in Anatomy, two oblong flattened glands, the office of which is to separate the urine from the blood. One of them lies on the right, and the other on the left, of the back-bone. At the middle of each kidney, where the blood-vessels enter, is a large membranous bag, which diminishes like a funnel, and forms a long canal (the ureter), that conveys the urine from the kidney to the bladder.

KIL'LAS, a provincial name for the clay-slate rocks of Cornwall.

KILN (*cyln: Sax.*), a large furnace or stove, used for heating, drying, or burning: thus, a *malt-kiln, brick-kiln*, &c.

KIL'OGRAMME or KIL'OGRAM (*chilias*, a thousand: *Gr.*; and *gramme*), one thousand French grammes, or 15,434 grains troy.

KIL'OLITRE (*chilias*, a thousand: *Gr.*; and *litre*), one thousand French litres, or 61,028 cubic inches.

KIL'OMETRE (*chilias*, a thousand: *Gr.*; and *mètre*), one thousand French mètres, or 39,370·091 inches=3280·9 feet.

KINCOB, Indian brocade.

KING (*cyning: Sax.*), in Ancient and Modern History, the name given to an officer who exercises the supreme functions of political government. Kings are *absolute* monarchs, when they possess the powers of government without control, or the entire sovereignty over a nation; and *limited* monarchs, when their power is restrained by fixed laws; *hereditary*, when they hold the powers of government by right of birth or inheritance; and *elective*, when raised to the throne by election.——The English monarch's power is limited. He has the prerogative of commanding armies and equipping fleets; but without the concurrence of his parliament he cannot maintain them. He can bestow places and employments; but without his parliament he cannot pay the salaries attached to them. He can declare war; but without his parliament it is impossible for him to carry it on. 'He can do no wrong;' since his ministers are accountable for the acts they advise. The law ascribes to a king of England, in his *political* capacity, immortality, for 'the king never dies;' and on his decease, which is called his demise, his regal dignity is vested, without any interregnum or interval, at once in his heir.

KING-AT-ARMS, in Heraldry, an officer of great antiquity, whose business is to direct the heralds, preside at their chapters, and have the jurisdiction of armoury. In England there are three kings-at-arms, *Garter*, *Clarencieux*, and *Norroy*: the first is called *principal king-at-arms*, the other two *provincial kings*. Norroy officiates north of the Trent. There are also *Lion* king-at-arms for Scotland, and *Ulster* king-at-arms for Ireland.

KING'DOM, in Natural History, a general division of natural objects, as the *animal*, the *mineral*, and the *vegetable kingdoms*.

KING'FISHER. [See HALCYON.]

KINGS, BOOKS OF, two canonical books of the Old Testament, so called because they contain the history of the kings of Israel and Judah, from the beginning of the reign of Solomon down to the Babylonish captivity, for the space of nearly six hundred years.

KING'S BENCH (*Bancus Regius*), so called because the king used formerly to sit there in person. It may follow the person of the sovereign to any part of the kingdom, but for centuries has been held at the ancient royal palace of Westminster. It is the supreme court of common law in this kingdom, consisting of the Lord Chief Justice, and four puisne or inferior judges, who hear and determine, for the most part, all pleas which concern the crown. The jurisdiction of this court is very extensive. Its justices are sovereign justices of oyer and terminer, of gaol delivery, and of eyre; supreme conservators of the peace; and coroners throughout England, some provincial jurisdictions excepted. They have cognizance of all matters of a criminal and public nature, judicially brought before them, to give remedy either by the common law or by statute; and their power is original and ordinary: that is, after the king has appointed them, they do not derive their jurisdiction from him, but from the law. They can take any cause out of an inferior court, by a writ of *certiorari*, and, by means of a *prohibition*, can restrain all other courts from proceeding, where they exceed or misuse their powers. Whatever crime is against the public good, though it does not injure any particular person, comes within the scope of the jurisdiction of this court; and no subject can suffer any kind of unlawful violence or injury to his person, liberty, or possessions, but he may here have a proper remedy, not only by way of satisfaction in damages, but by the exemplary punishment of the offender: for this court is considered as the guardian of the morals of all the subjects of the realm. It is in the discretion of this court to inflict fine and imprisonment, or punishment more severe, on offenders. It may commit to any prison it shall think proper, and the law allows no other court to remove or bail persons it imprisons; but this court may grant a *habeas-corpus* to relieve persons imprisoned by any other authority or means. This court can try all causes capable of coming before a jury, in many of which the sovereign is plaintiff. There is a *crown side*, or *crown office*, which takes cognizance of all criminal causes, from treason down to the most trivial breach of the peace; and a *plea* side, which takes cognizance of civil causes.

KING'S E'VIL, in Medicine, a scrofulous disease usually attended with suppurating tumours. The gift of curing this disease was formerly attributed to the kings and queens of England, and had its origin in the time of Edward the Confessor; but the practice of *touching for the evil* (as it was termed) has been discontinued since Queen Anne's time.

KIN'IC ACID, sometimes called *cinchonic acid*, is obtained from the cinchona bark. It forms salts called *kinates*.

KI'NO (*Ind.*), an extract obtained from some species of *Pterocarpus*, leguminous trees growing in Africa and the East Indies. The best kind is in the form of brilliant fragments of a deep brownish-red colour. It contains tannin, gum, and extractive matter, and is highly astringent.

KI'OSK (*Turk.*), a kind of summer-house, or open pavilion, with a tent-shaped roof, and supported by pillars. *Kiosks* have been introduced from Turkey and Persia into European gardens, which they greatly embellish

KIP'PER, a term applied to a salmon when unfit to be taken, and to the time when they are so considered. *Kippered* salmon means salmon split open, salted and dried or smoked.

KIRK (*kirche: Ger.*), the name given in Scotland to the church, as a building, and also to the form of religion established in that country.——KIRK-SESSIONS, an inferior ecclesiastical court in Scotland, consisting of the ministers, elders, and deacons of a parish.

KIRSCH'WASSER (cherry-water: *Germ.*), a spirituous liquor obtained by fermenting and distilling bruised cherries, called *kirschen* in German. It often contains a considerable amount of prussic acid, derived from the bruised kernels of the fruit.

KIT'-CAT, a term applied to a portrait three-fourths of the length of the body. The word originated with a club in London, to which Addison and Steele belonged, and which was so called from a pastrycook named Christopher (Kit) Cat, who served it with mutton-pies! It was necessary that the pictures which decorated the room in which the club met should be of this size, on account of its height. Among these were the portraits of the members, painted by Sir Godfrey Kneller.

KITE (*cyte: Sax.*), a bird of prey, the *Falco Milvus*, remarkable for gliding through the air without often moving its wings. The tail is forked, which distinguishes it from all other British birds of prey.——KITE, a plaything for boys, consisting of a slight wooden frame covered with paper, and constructed so as to rise in the air, where, by the aid of a long string, it may be allowed to fly at the pleasure of the person who holds it. Romas in France, and Dr. Franklin in America, first used a kite for the purpose of raising an electrical conductor into the air, and bringing down atmospheric electricity—a very dangerous experiment, particularly in a thunderstorm, and fatal to one experimentalist.

KIWI-KIWI, the New Zealander's name for some species of rare birds allied to the ostriches and belonging to the genus *Apteryx* of naturalists. They have long bills, hair-like plumage, and wings so small that they appear to have none until closely examined. The plumage is prized as an ornament by the Maori chiefs.

KNEE'-PAN, in Anatomy, the *patella*, a little round bone placed in the fore-part of the knee. It is attached by a ligament to the upper surface of the tibia. It protects the joint in front and changes the direction of the tendons which descend from the thigh to be inserted in the tibia.

KNEES (*cneo*, the knee: *Sax.*), in Naval Architecture, pieces of timber bowed like a knee, which bind the beams and side timbers together.——KNEES, in Russia, nobles of the first class, descended from the former ruling families of particular provinces in the Russian empire.

KNIGHT (*knecht*, an attendant: *Ger.*), a title of honour, originally bestowed on every young man of rank after he was admitted to the privilege of bearing arms. It is now an order of gentlemen next to baronets, or a mere honorary distinction. A knight is at present made by the sovereign touching him with a sword as he kneels, and saying, 'Rise up, Sir Thomas Phillips,' or whatever may be the name of him who receives the honour of knighthood [See CHIVALRY.]

KNIGHT-ER'RANT, in the language of Chivalry, a knight wandering in search of adventures, sometimes under vows for a certain period; he was not altogether a fiction of romance.

KNIGHT-MAR'SHAL, an officer in the royal household of Great Britain and Ireland, who formerly had jurisdiction and cognizance of offences committed within the household and verge, and of all contracts to which members of the household were parties.

KNIGHT OF THE SHIRE, a member of parliament representing a *shire*, in contradistinction from a burgess, who represents a *borough*. A knight of the shire is so called, because, as the *terms* of the writ for election still require, it was formerly necessary that he should be a knight. This restriction was coeval with the tenure of knight-service, when every man who received a knight's fee immediately of the crown was constrained to be a knight; but at present any person may be chosen to fill this office, and he does not now require a money qualification.

KNIGHT'-SERVICE, a tenure of lands, instituted on the decline of the feudal spirit, with the view of reviving political vigour. It originally consisted in investiture of lands, upon express condition that the person so invested should serve in the wars of his lord.

KNIGHT'HOOD, ORDERS OF. These were of two kinds: associations or fraternities of a religious character, such as those of the Templars, Hospitallers, and Teutonic knights; or mere honorary bodies, established by sovereigns, such as the order of the Garter.

KNOT (*knoten: Germ.*), in Seamen's language, one of the divisions of the log-line, which, to avoid the necessity of calculation, are at such intervals that the number of knots unwound while the glass runs down shows the number of miles sailed per hour. Thus, let it be a half-minute glass, it will run down 120 times in an hour; if, therefore, the knots, which are pieces of coloured cloth, are fastened at distances each equal to the 120th part of a mile, the number of knots run out will be the number of miles per hour. A *nautical* mile is the sixtieth of a degree, or about 6,100 feet; the one-hundred-and-twentieth of this is 51 feet; hence, with a half-minute glass, the knots must be 51 feet apart, and at a proportional distance with any other glass. The first knot is placed about five fathoms from the log, to allow the latter to get clear of the ship, and that space is called the *stray* line. [See LOG.]——KNOT, a fen bird allied to the snipes, the *Tringa canutus* of ornithologists, the flesh of which is very delicious.

KNOUT, an instrument of punishment in Russia. It consists of a handle two feet long, having a flat leathern thong about four feet long attached to it. At the end of the thong is a ring of brass, to which is fastened a strip of hide which has been soaked in milk and dried in the sun to make it hard, and is about two inches wide at first, but terminates in a point. A practised hand will deeply indent a deal board with this cruel instrument. If it happen to strike the culprit with its edge it cuts like a knife.

KOL'LYRITE, in Mineralogy, hydrous silicate of alumina, a variety of clay, the colour of which is either pure white or slightly shaded with grey or yellow.

KO'RAN. [See ALCORAN.]

KOU'MISS or KU'MISS, an intoxicating liquor made by the Calmuck Tartars, by fermenting and distilling mare's milk.

KOUPH'OLITE (*kouphos*, light; and *lithos*, a stone: *Gr.*), in Mineralogy, a variety of *phrenite*, of a greenish-white colour, translucent, glistening, and pearly. It is found in the Pyrenees.

KRA'KEN (*Germ.*), a name formerly applied to a fabulous marine monster of great size.

KRE'OSOTE. [See CREOSOTE.]

KU'FIC, a term applied to the ancient Arabic letters, &c., so called from Kufa or the Euphrates.

KY'ANITE. [See CYANITE.]

L

L, the twelfth letter of the English alphabet. It is the first mute, or semi-vowel, and is formed in the voice by intercepting the breath between the tip of the tongue and the fore-part of the palate, with the mouth open. There is something of aspiration in its sound, and therefore our British ancestors usually doubled it, or added an *h* to it; as in *llan*, or *lhan*, a temple. In English words of one syllable, it is doubled at the end, as in *all*, *wall*, *mill*, *well*, &c., but not after diphthongs and digraphs, as *foul*, *fool*, *prowl*, *growl*, *foal*, &c; some words of more syllables than one, as *foretel*, &c., are now written with a double *l*. In some words, *l* is silent, as in *half*, *calf*, *talk*, *chalk*. In combination, it may be placed after most of the consonants, as in *blue*, *clear*, *flame*, &c., but before none of them. In some ancient languages, it is represented by two lines forming an angle. In the Greek, the vertex of the angle is at the top; in the Etruscan, at the right-hand side; in the Celtic, at the left, or below, &c. The Romans used it as an abbreviation for *Lucius*; for *Sestertium*, the equivalent to a thousand sesterces, as LLS. [see H.] We use it for *Law*, as B C L. *Bachelor of Civil Law*; and doubled for *Laws*, as LL.D. *Doctor of Laws*; for *loco*, as L.S. *Loco Sigilli* (the place of the seal); also, with figures, for the sign of the pound sterling (abbrev. of *libra*, a pound: *Lat.*) As a numeral, L denoted, with the Romans, 50; and, with a dash over it, 50,000.

LA, in Music, the syllable by which Guido indicated the sixth note in the scale. [See GAMUT.]

LAB'ADISTS, a sect who lived in the 17th century, the followers of Jean de Labadie. They endeavoured to introduce the doctrines of the Quietists among Protestants [see QUIETISM]; and, like the Quietists, were in some instances guilty of immorality.

LA'BARUM (*Lat.*), in Roman Antiquity, the standard borne before the emperors; being a rich purple streamer, supported by a spear. It was introduced by Constantine after his conversion, and contained a figure of the cross and the Greek words '*en touto nika*,' conquer in this

LAB'DANUM or LAD'ANUM, the resin of the *Cystus Creticus*, a shrub which grows in Arabia, Candia, and other parts of the Greek Archipelago. It is used in medicine, chiefly in external applications.

LA'BEL (*labellum*, a small slip of writing: *Lat.*), in Heraldry, a figure, chiefly used as a distinction or difference in the coat armour of an eldest son, in which case it has three points. If borne by the heir presumptive to a grandfather living, it has five points; and so on.

LA'BELLUM (dim of *labium*, a lip: *Lat.*), in Botany, the middle division of the corolla in orchids. It is usually larger than the other divisions, and unlike them in form. It is not unfrequently spurred or furnished with appendages.

LA'BIA (*Lat.*), in Anatomy, the lips, the red part of which is called *Prolabium*, and the angles their commissures.

LA'BIALS (*labium*, a lip: *Lat.*), in Grammar, an epithet for those letters which are pronounced chiefly by means of the lips, viz *b*, *f*, *m*, *p*, *v*.

LABIA'TÆ, a natural order of plants consisting of herbs and undershrubs natives for the most part of temperate regions. The corolla is more or less bi-labiate, whence the name of the order. The plants abound with volatile oils, which are largely employed in the manufacture of perfumery. Many kitchen herbs belong to this order, such as mint, thyme, sage, marjoram, and savory. The well-known lavender, hyssop, rosemary, and salvia, as well as the fragrant patchouli, are placed here.

LA'BIATE (same *deriv.*), lipped; a term applied by botanists to a monopetalous corolla with two lip-like divisions of the limb, such as is seen in the order *Labiatæ*.

LAB'ORATORY (*laboro*, I work out: *Lat.*), a workshop or building, properly fitted up with apparatus necessary for the various operations, processes, and experiments, that may be required by the practical chemist.——In military affairs, a place where all sorts of fireworks are prepared, both for actual service and for experiments.

LA'BOUR (*labor: Lat.*) It is interesting to mark the progressive advance in the price of labour during the last 500 years, compared with the prices of provisions; and satisfactory at the same time to know that the wages of the labourer and artisan of every description have risen in a much greater proportion than wheat, by the price of which their wages were originally regulated. In the year 1352, 25 Edw. III, wheat was 1*s.* 10*d.* per bushel. The following are the rates of wages *per day* at that time, as established by law:—Haymakers, 1*d.* A mower of meadows, 5*d* ; or 6*d.* an acre Reapers of corn, in the first week of August, 2*d.*, in the second, 3*d.*, and so till the end of August, without meat, drink, or other allowance, finding their own tools. For threshing a quarter of wheat or rye, 2½*d.* ; a quarter of barley, beans, peas, and oats, 1½*d.* A master carpenter received 3*d.* per day; other carpenters, 2*d.* A master mason, 4*d* ; other masons, 3*d.* ; and their servants, 1½*d.* Nearly a century after, *i. e.* in the year 1455, 23 Henry VI, the wages were:—For a bailiff of husbandry, 23*s* 4*d.* per annum, and clothing of the value of 5*s*, with meat and drink ; chief hind, carter, or shepherd, 20*s.*, clothing 4*s.*; boy under 14 years, 6*s.*, clothing 3*s.* Free mason, or master carpenter, 4*d* per day, and, without meat or drink, 5½*d.* Master tiler or slater, mason, or ordinary carpenter, and other artificers concerned in building, 3*d.* per day, and, without meat and drink, 4½*d.*; every other labourer 2*d.*, and, without meat and drink, 3½*d.* ; after Michaelmas there was a proportional abatement. In time of harvest, a mower 4*d* a day, and, without meat and drink, 6*d.* ; a reaper or carter, 3*d.*, and, without meat and drink, 5*d.*; a woman labourer, and other labourers, 2*d.* per day, and, without meat and drink, 4½*d.*——It has been found that the factory operative in England works 69 hours per week, for which, on an average, he has 11*s* wages; in France, he works from 72 to 84 hours, and has 5*s* 8*d.*; in Switzerland, he works from 78 to 84 hours, and has 4*s.* 5*d* ; in the Tyrol, he works from 72 to 80 hours, and has 4*s.*; in Saxony, he works 72 hours, and has 3*s.* 6*d.* ; at Bonn, in Prussia, he works 94 hours, and has 2*s.* 6*d.*

LAB'RADORITE or LAB'RADOR SPAR, a mineral found on the coast of Labrador, and also in some parts of Europe. It is a variety of opaline felspar, and reflects beautiful colours, according to the direction in which the light falls on it.

LAB'YRINTH (*laburinthos: Gr.*), a *maze* or place full of intricate windings, which render it difficult to find the way from the interior to the entrance. The labyrinth of Egypt, built by Psammetichus, on the banks of the Nile, consisted of twelve contiguous palaces, containing 3000 chambers, 1500 of which were underground. Pliny says it existed in his time, and was then 3600 years old. There were also other celebrated labyrinths in antiquity, such as those of Crete, Cusium, &c.——LABYRINTH, in Anatomy, that part of the internal ear which is behind the cavity of the tympanum.

LABYRIN'THODON (*laburinthos*, a labyrinth ; *odous*, a tooth : *Gr.*), a genus of fossil batrachians, of which a few bones and some foot-marks have been found in the triassic strata of Europe. The animals appear to have been gigantic frogs. The structure of the teeth is very curious, exhibiting a radiating series of folds which resemble the windings on the surface of the brain.

LAC. [See GUM-LAC.]

LAC'CIC A'CID, an acid obtained from stick-lac. It is yellow, crystallizable, and forms salts termed *laccates*.

LACE, a delicate kind of network, used as an ornament of dress, formed of silk, cotton, or flax, &c. The most celebrated and costly is made at Brussels. Buckinghamshire formerly manufactured large quantities of what was called pillow or bobbin lace, from being woven upon a pillow or cushion by means of bobbins; but the machine lace of England is now equal to any wrought by hand, and is much cheaper. In speaking of the modern machine-made bobbin-net lace, Dr. Ure says, 'This elegant texture possesses all the strength and regularity of the old Buckingham lace, and is far superior in these respects to the point net and warp lace, which had preceded, and, in some measure, paved the way for it. Bobbin-net may be said to surpass every other branch of human industry in the complex ingenuity of its machinery; one of Fisher's spotting frames being as much beyond the most curious chronometer in multiplicity of mechanical device as that is beyond a common roasting-jack.' A *rack* of lace is a certain length of work, which, counted perpendicularly, contains 240 meshes or holes ; and such has been the progress of improvement and economy in this manufacture, that the cost of labour in making a *rack*, which was, twenty years ago, 3*s* 6*d.*, is now not more than one penny!——*Lace made by caterpillars.* These animals have been very ingeniously used as a means of producing an exceedingly fine kind of lace, possessed of considerable durability. A stone slab or other flat body having been covered with a paste, made of the leaves of the plant on which the caterpillar feeds, the pattern intended to be left open is drawn upon it with olive-oil, and, having been placed in a sloping position, caterpillars remarkable for producing a strong web are put at its lower side. They eat and spin their way to the top, carefully avoiding every place that has been touched with the oil. A veil made in this way, 26½ inches by 17 inches weighed only 1·51 gr. One of the same size, made of the finest patent net, would weigh about sixty times as much.

LACE BARK, the inner bark of an evergreen shrub, a native of Jamaica, the *Lagetta linteana*, nat. order *Thymelaceæ*. When macerated and stretched it has the appearance of coarse lace or net.

LACER'TA (a lizard : *Lat.*), in Zoology, the *Lizard*. The gradual discovery of many new forms has caused naturalists to form several genera in place of the Linnæan genus Lacerta. These constitute the family, *Lacertinidæ*. The species are all scaly four-legged reptiles furnished with long tails. They are harmless, timid, and nimble in their motions, feeding on insects and fruit, and loving warmth.

LACH'RYMAL (*lachryma*, a tear: *Lat.*), an appellation given to several parts of the eye from their serving to secrete or convey away the tears: as the *lachrymal ducts*, the *lachrymal glands*.

LACHRYM'ATORY (same *deriv.*), in Antiquity, a small glass bottle or phial in which were collected the tears of a deceased person's friends, and preserved along with the ashes and urn. Many of them have been found in the tombs and sepulchres of the ancients.

LA'CING (*lacer*, to lace: *Fr.*), among mariners, the rope or line used to confine the heads of sails to their yards.

LACIN'IATED (*lacinia*, a lappet: *Lat.*), in Botany, an epithet denoting a leaf which has several sinuses down to the middle, and the lobes which separate these indented or jagged.

LACK (*lakh*, an East Indian word), in Commerce, the number of 100,000 rupees, equal to about 10,000*l.* sterling.

LAC'QUER or LACK'ER (*lac*, a gum used in the varnish), a sort of varnish applied to tin, brass, or other metals. The basis of lacquer is a solution of shellac in alcohol, coloured with gamboge, saffron, &c. It is used to give a golden colour to brass and other metals, and to preserve their lustre.

LAC'TEALS or LAC'TEAL VES'SELS (*lac*, milk: *Lat.*), in Anatomy, the absorbents of the mesentery, which convey the milklike fluid, termed *chyle*, from the small intestines to the thoracic duct.

LAC'TIC A'CID (same *deriv.*), in Chemistry, the acid of sour milk, and the constant product of the fermentation of sugar, starch, and bodies of that class. It may be obtained from beet-root; and the acidity of sauerkraut is due to its presence. The juice of flesh contains it. Its salts are termed lactates.

LACTIF'EROUS (*lac*, milk: and *fero*, I bear: *Lat.*) or LACTESCENT, in Botany, an appellation given to plants abounding with a milky juice, as the sow-thistle and euphorbia.

LACTOM'ETER (*gala*, milk; and *metron*, a measure: *Gr.*; or *lac*, milk: *Lat.*; and *metron*, a measure: *Gr.*), an instrument for ascertaining the quantity of cream in milk.

LACTU'CA (a lettuce; from *lac*, milk: *Lat.*, on account of the appearance of its juice), in Botany, the name of a genus of plants: nat. ord. *Compositæ*. The *Lactuca sativa*, or common lettuce, is a well-known salad herb. The *Lactuca virosa*, or strong-scented lettuce, a common plant in our hedges and ditches, has an opiate juice.

LACU'NAR (*Lat.*), in Architecture, the ceiling or under surface of the member of an order; the under side of the corona of a cornice; the under side of the architrave, between the columns. Any ceiling or under surface, consisting of compartments sunk, but without spaces or bands between the panels, is a *lacunar*: if there are bands, it is a *laquear*.

LACUS'TRINE (*lacus*, a lake: *Lat.*), appertaining to a lake. *Lacustrine Dwellings* are the dwellings of ancient peoples, carried on piles over a lake. The piles on which such dwellings stood, and the remains of pottery and implements in stone, bone, and metal, have been recently discovered in several lakes in Switzerland, Savoy, and Scotland.——*Lacustrine deposits*, in Geology, are the deposits at the bottom of lakes.

LA'DY-BIRD or LA'DY-COW, in Entomology, small beetles with red or yellow wing-cases marked with black spots, belonging to the genus *Coccinella*. They, as well as their larvæ, feed on aphides or plant lice.

LA'DY-DAY, the 25th of March, so called because it is the day of the Annunciation of the Virgin Mary.

LADY'S-SLIPPER, a rare English orchid, the *Cypripedium calceolus* of botanists; the labellum or middle petal is inflated and bears some remote resemblance to a slipper.

LAGOON' (*lagone*, a pool: *Ital.*), a name given to those creeks, or shallow lakes, which extend along the shore of the Adriatic, and which contain numerous small islands: Venice, for instance, is built on sixty of them. Towards the sea the islets are secured by dams, natural or artificial.

LAGOON ISLAND. [See ATOLL.]

LAGOPHTHAL'MIA (*lagōs*, a hare; and *ophthalmos*, an eye: *Gr.*), in Medicine, a disease in which the eye cannot be shut. It may arise from various causes, but the most frequent is a cicatrix, after a wound, ulcer, or burn.

LAG'OPUS (*lagōs*, a hare; *pous*, foot: *Gr.*), a genus of gallinaceous birds, belonging to the family of *Tetraonidæ*, and including the PTARMIGAN and RED GROUSE.

LAIR (*lager: Ger.*), among sportsmen, the place where the deer harbour by day. This term is also used to signify a place where cattle usually rest under shelter; also the bed or couch of a wild beast.

LAIRD, a title of honour in the Highlands, formerly equivalent to *Lord*, but now applied to a landed proprietor under the degree of knight.

LAKE (*lacus: Lat.*), a large collection of inland water, having no direct communication with the ocean. The largest lake on the old continent is the Caspian Sea, 700 miles long, and 200 broad. In North America, a series of magnificent lakes run into each other, the largest of which, Lake Superior, is 540 miles long, and 150 broad. All the great American lakes are of fresh water.——LAKE, in Painting, a fine red colour, between carmine and vermillion. It is formed by precipitating the colouring matter from vegetable solutions, or cochineal, by means of alum or oxide of tin. There are *cochineal* and *lac* lakes, *madder* lake, &c.

LAMAISM, the form of BUDDHISM (which see) prevalent in Tibet. The Grand (Dalai) Lama, the successor of Sakya-sinha, or Buddha the founder of Buddhism, and who is believed to be animated by the perfectly virtuous soul of that holy man, resides at Teshu Lumbo, in the north of Tibet, and is undoubtedly one of the most honoured beings living in the world. He is worshipped as a supernatural being by his subjects, and is never to be seen but in the secret recesses of his palace, where he sits cross-legged on a cushion. The people believe that the supreme divinity lies in him, that he knows and sees everything in the deepest recesses of the heart, and that he never dies, but that, on the dissolution of his mortal frame, his soul enters into another body, in which he is born again, and in which he can be discovered only by some among a favoured class of priests. The worship paid to him by his followers consists in clamorous songs and prayers, in splendid processions, in the solemnisation of certain festivals, and in austerities practised by them. The inferior priests are also called Lamas, and their residences Lamaseries; on all their temples and sacred articles are inscribed the words 'Om Mani Padari om,' an invocation to Sakya, and supposed to signify 'Hail to him of the Lotus and Jewel.' Sakya is usually represented as holding a lotus flower with a jewel in it. These words are continually in the mouths of the devotees, and are placed upon the cylinders, which are so mounted that they can be made to revolve by means of a piece of string. Inside are placed written prayers, which are supposed to be repeated every time the cylinder makes a revolution. There are also praying machines turned by a stream of water. These consist likewise of revolving cylinders containing prayers, and their rotation is believed to redound to the benefit of the faithful. There are two principal sects of Lamas, those who wear red mitres and those who wear yellow. The yellow-mitred Lamas have, however, driven the red mitres out of Tibet, and the latter are now only to be found in Sikkim and Bhotan, amongst the Himalayas.

LAM'BDACISM (*lambdakismos*, from *lambda*, the Greek *l*), a fault in speaking, which consists in too much stress being laid on the pronunciation of the letter *l*.

LAMBDOI'DAL (*lambdoeidēs*, from *lambda*, the Greek *l*; and *eidos*, form: *Gr.*), in Anatomy, an epithet for a suture of the occiput.

LAMEL'LÆ (*Lat.*), in Natural History, thin plates.

LAMENTA'TIONS (*lamentatio: Lat.*), a canonical book of the Old Testament, written by the prophet Jeremiah. The first four chapters of the Lamentations are an *abecedary*, every verse or couplet beginning with one of the letters of the Hebrew alphabet, in the alphabetical order.

LA'MIÆ (*Lat.*), the name given by the Romans to evil spirits, who, they supposed, assumed the shape of handsome women, but changed themselves into ugly shapes whenever they chose. They could take out and replace their eyes, and amongst other evil deeds they devoured children.

LAM'INA (a thin plate: *Lat.*), a layer coat or thin plate; applied to the plates of minerals, bones, &c.——In Botany, the broad or spreading part of a petal as distinguished from the tube or claw. Also the broad part of a leaf as distinguished from the stalk.——In Mineralogy, a plate or thin piece of metal.——**LAMINÆ**, in Anatomy, the two plates or tables of the skull.

LAM'INABLE (same *deriv.*), an epithet for a metal which may be extended by passing it between steel or hardened cast-iron rollers.

LAM'MAS-DAY, a festival celebrated on the first of August by the Roman Catholic church, in memory of St. Peter's imprisonment. This word has been derived from *Lamb-mass*, on account of the custom, observed in some places, of bringing a lamb alive into the church on this day during mass; also from *Loaf-mass*, considering it a thanksgiving day for the first fruits of the corn, &c.

LAM'PAS or **LAM'PERS** (*lampas*, a torch: *Gr.*), a swelling in the palate of a horse's mouth. It is so called, because cured by burning with a lamp or hot iron.

LAMP'BLACK, a colour procured from the soot of a lamp; or rather, a fine soot formed by the condensation of the smoke of burning pitch, or some resinous substance in a chimney terminating in a cone of cloth.

LAM'PREY, a genus of eel-like fishes, which adhere firmly to rocks and other bodies by the suctorial mouth. They form the genus *Petromyzon* of ichthyologists. Their bones are cartilaginous, and they are destitute of fins at the fore part of the body. They are considered a delicacy, and are in season in the months of March, April, and May. Three species have been taken in British rivers. [See PETROMYZON.]

LAMPY'RIDÆ (*lampuris*, a glow-worm: *Gr.*), a family of soft-skinned serricorn beetles, in one division of which the female is luminous. [See GLOW-WORM.]

LA'NATE (*lanatus*, furnished with wool: *Lat.*), in Botany, covered with a substance like curled hairs; as a *lanate* leaf or stem.

LAN'CASTER, CHANCELLOR OF THE DUCHY OF, the officer before whom, or his deputy, the court of the duchy of Lancaster is held. The office has long been a sinecure; its salary is 4000*l.* per annum. Its holder has a seat in the cabinet.

LAN'CEOLATE (*lanceolatus*, from *lancea*, a lance: *Lat.*), in Botany, oblong and gradually tapering towards each extremity; as, a *lanceolate* leaf.

LA'NCERS (same *deriv.*), a body of men armed with long lances, and mounted on swift horses. They were first employed in Poland, but are now common in other countries. In the British army there are five regiments of lancers.

LA'NCET (*lancette: Fr.*), a two-edged surgical instrument, used in bleeding, opening tumours, &c.

LAND (*Ger.*), in Geography, the solid matter which constitutes the fixed part of the surface of the globe, as distinguished from water.——**LAND**, in seamen's language, makes part of several compound terms: thus, *to make the land* is to discover land from sea, as the ship approaches it. *Land-locked* is when land lies all round the ship so that no visible point is open to the sea: if at anchor in such a place, she is said to ride land-locked, and is considered safe from wind and tide. A *land-mark* is any mountain, rock, steeple, tree, &c., that may serve to make the land known at sea, and thus direct ships passing by how to steer, so as to avoid rocks, shoals, whirlpools, &c The *land is shut in*, when another point of land hinders the sight of that from which the ship came. The ship lies *land to*, when she is so far from shore that it can only be just discerned. *Land-turn* is a wind that in almost all hot countries blows, at certain times, from the shore in the night. *To set the land* is to see by the compass how it bears from the ship. A *land-breeze* is a current of air which, in many parts within the tropics, particularly in the West Indies, regularly sets from the land towards the sea during the night, and this even on opposite points of the coast. The land radiates heat much more rapidly than the sea, and consequently the air upon it becomes colder and more dense than that over the sea. It, therefore, presses upon and takes the place of the latter which ascends. This process will take place as long as the radiation goes on. By day the reverse process takes place by reason of the greater heating of the air over the land.

LANDAU', a coach which separates at the top, so as to form an open carriage. It derives its name from the place in Germany where it was originally made.

LAND'GRAVE (*landgraf*, land-count: *Ger.*), a title assumed by some German counts, in the 12th century, to distinguish them from the counts under their jurisdiction.

LAND'ING (*landung*: *Ger*), in Architecture, the first part of a floor at the head of a flight of stairs.

LAND'SLIP, the sliding down of a considerable tract of land from a more elevated place, on account of an earthquake, of being undermined by water, &c.

LAND'WAITER, an officer of the Custom-house, whose duty it is, upon landing any merchandise, to examine and take an account of the various articles.

LAND'WEHR (land guard: *Ger.*), the militia of Prussia and Austria.

LAN'GREL SHOT or LAN'GRAGE, a particular kind of shot used at sea for disabling the sails and rigging of an enemy's ship. It consists of two bars of iron, which are joined in the middle by a chain or shackle, that it may be the more easily put into the gun, and half a ball of iron at each end: it does great execution among the enemy's rigging.

LAN'GUAGE (*langage*: *Fr.*), the faculty of articulate speech is one of the marks by which man is distinguished from the brutes. As to the origin of speech several theories have been proposed, but that seems the most probable which assumes it to be the result of a mental instinct, from being given to it by the intellect. The study of languages, comparing one with another so as to ascertain the principles common to all, and the principles distinctive of each class or family, has been pursued on a rational system only of late years, and though something has been done in regard to tracing the growth and relationship of tongues, much remains to be effected before the study can take its place amongst other sciences. After investigating the grammars of the best known tongues it has been proposed to divide them into three families, viz.: the Aryan, Semitic, and Turanian, each containing various languages, dead and living. The Aryan family embraces the Sanscrit, Celtic, Italic, Hellenic, Teutonic, and other languages. The Semitic division comprehends the Arabic Hebrew and Syriac with their cognate tongues. To the northern division of the Turanian family belong the Mongolian, Turkish, Finnish, and other languages, whilst in the southern division of that family are placed the Malayan and many little known eastern tongues.

LAN'GUED (*langue*, the tongue: *Fr.*), in Heraldry, an epithet for the tongue of an animal, represented of a different tincture from the body.

LANGUEN'TE (*Ital.*), a musical term, signifying that the passage is to be performed softly or languishingly.

LAN'IARD, a short piece of rope or line, fastened to several portions of a ship's rigging, &c., and serving to secure them in their places; but more especially those used to extend the shrouds and stays of the masts.

LANIG'EROUS (*laniger*, fleece-bearing: *Lat.*) or LANUGINOUS, an epithet applied to such trees as bear a woolly or downy substance, such as the catkins of willows, &c.

LA'NIUS (a butcher; from *lanio*, I tear to pieces: *Lat.*), in Ornithology, a genus of passerine birds, known as *Shrikes* or *Butcher-birds*, so called from the savage manner in which they rend their prey, which consists of small birds. They have straight bills with a tooth on each mandible at the extremity, like other *dentirostres*, and a tongue jagged at each end. The species best known in England are the Great Shrike (*Lanius Excubitor*) and the Red-backed Shrike (*Lanius Collurio*). The shrikes imitate part of the songs of other birds near them. They have acquired one of these common names from the habit they have of hanging up their prey (mice, frogs, small birds, &c.) upon a thorn, or wedged in a forked branch, as a butcher hangs up his meat. This is for the convenience of tearing the food in pieces.

LANNER, the *Falco lanarius* of ornithologists, a bird of prey which inhabits the south of Europe. In size it is between the Peregrine and the Gyr-falcon. The male, which is smaller, is called the Lanneret.

LANS'QUENETS (*landes knecht*, a country lad: *Ger.*), German infantry, raised by the emperor Maximilian, to oppose that of the Swiss, in the fifteenth century.

LAN'TERN (*lanterne*: *Fr.*), in Architecture, an erection, either square, circular, elliptical, or polygonal, on the plan; placed on the top of a dome, or over an apartment, to give light.

LAN'TERN-FLY, a homopterous insect of South America, of the genus *Fulgora*, said to emit a strong phosphoric light from some part of its head; but the existence of this property has been denied.

LAOC'OON, a celebrated relic of Greek sculpture, executed in marble by Agesander and his two sons, Polydorus and Athenodorus, the three most celebrated artists at Rhodes. This fine production of antiquity was found at Rome in the palace of Titus, in the beginning of the 16th century, and is now in the Vatican Museum at Rome. Laocoon, a priest of Neptune, is represented, with his two sons, enveloped in the folds of two monstrous serpents; and the whole displays the most thorough knowledge of anatomy, of character, and of ideal perfection. The story of the serpents issuing from the sea, and strangling the priest whilst sacrificing a bullock, and twining round the sons, is told by Virgil in the second book of the Æneid.

LAP'IDARY (*lapidarius*, relating to stones: *Lat.*), one who polishes and engraves stones. This is effected by means of friction produced by wheels of various materials, according to the nature of the stone to be worked. Thus diamonds require wheels of soft steel; rubies, sapphires, and topazes, copper wheels; emeralds, amethysts, &c., leaden wheels—worked with oil and various powders.——The term is also applied to a virtuoso skilled in the nature, kinds, &c., of precious stones, or a merchant who deals in them.——LAPIDARY STYLE, that which is proper for monumental or other inscriptions, requiring terseness, compactness, and elegance.

LA'PIS (*Lat.*), in Roman Antiquity, a mile; because, at every mile, a stone (*lapis*) was erected, with the distance from Rome marked upon it. Thus *centesimus lapis*, or *centesimum* (*ad centesimum lapidem*, if written in full), meant one hundred miles from that city. The use of milestones has been adopted by all the nations of modern Europe.

LA'PIS LA'ZULI, a blue mineral, consisting chiefly of silica and alumina, with a little soda, and some peculiar combination of sulphur, to which its colour is considered due. It is often sprinkled with yellow pyrites, and is found in masses or nodules. It was formerly much used in inlaid work, and furnished the pigment called ULTRAMARINE (which see), until a new method of preparing this was discovered.

LA'PIS MARMO'REUS (marble stone: *Lat.*), in Archæology, a marble stone in Westminster Hall, in the midst of which stood a chair in which our kings anciently sat at their coronation. The courts of Chancery and King's Bench were erected over this stone.

LAPSE (*lapsus*, a slipping: *Lat.*), in Ecclesiastical Law, an omission on the part of the patron to present to a benefice within six months after it is vacant, upon which default the ordinary has a right to collate to it. If the ordinary neglect to present for six months, the right of presentation passes to the metropolitan; and if the metropolitan neglect for six months, to the crown.——LAPSED LEGACY, one which falls or is lost by a lapse; as where the legatee dies before the testator, or where a legacy is given upon a future contingency, and the legatee dies before the contingency happens. If the legatee who dies before the testator be a child of the latter, and leave issue, the legacy does not lapse, but goes to the issue—unless this is prevented by a clause in the will.

LAP'WING, or PEE-WIT, the *Vanellus cristatus* of ornithologists, a British bird allied to the plovers. The young ones are covered with a thick down when they are hatched; and at the approach of danger they squat down, while the mother tries to draw off the attention of the intruders, by fluttering about with cries of pain, and even running along the ground as if lame.

LAR'BOARD, a term for the left-hand side of a ship, when looking towards the stem or head; opposed to *starboard*. As serious mistakes are likely from the resemblance in sound between the words larboard and starboard, *port* is now generally used instead of the former.

LAR'CENY (*latrocinium*, highway robbery: *Lat.*), in Law, the felonious and fraudulent taking away the goods or property of another without his consent. Larceny was formerly divided into *grand* and *petty*: the former being the stealing of an article over the value of one shilling, and the latter not over that sum; but this, with other distinctions, has been abolished. In certain cases, however, in which without great rigour it would be difficult to preserve property, the punishment of larceny has been made very severe.

LARCH (*larix*: *Lat.*), a well-known deciduous-leafed coniferous tree, the *Larix Europæa* of botanists. It abounds with resin from which turpentine is obtained. Its timber is very strong and remarkably durable when exposed to the weather. Similar timber is yielded by two North American species, the black larch and red larch.

LA'RES (*Lat.*), in Antiquity, the domestic or household gods among the Romans, which the family honoured as their protectors. They were images of wood, stone, or metal, and generally stood upon the hearth in a kind of shrine. There were also Lares of the city, country, &c.

LAR'GO and **LARGHET'TO** (*Ital.*), musical terms directing a slow movement. *Largo* is one degree quicker than *grave*, and two degrees quicker than *adagio*. *Larghetto* is one degree quicker than *largo*.

LARK (*lerche*: *Ger.*), birds of the genus *Alauda*. The *sky-lark*, or *lavrock* (*Alauda arvensis*), which is the most harmonious of this musical family, commences its song early in the spring, continues it during the whole summer, and is one of those few birds that chant whilst on the wing. When it first rises from the earth, its notes are feeble and interrupted; as it ascends, however, they gradually swell to their full tone, and long after it is lost to the sight it still continues to charm the ear with its melody. It mounts almost perpendicularly, but descends in an oblique direction, unless threatened with danger, when it drops like a stone. The *wood-lark*, *Alauda arborea*, is distinguished by its smaller size and less distinct colours. It is generally found near the borders of woods, perches on trees, and sings during the night, so as to be sometimes mistaken for the nightingale. There are two or three other species, but they are very inferior as songsters to the before-mentioned.

LARK'SPUR, the name of plants belonging to the genus *Delphinium* (allied to the ranunculus and columbine) of which there are numerous species. Many of these are common in our gardens, where they are cultivated for the beauty and brilliant colours of their flowers.

LA'RUS (*Lat.;* from *laros: Gr.*), in Ornithology, a genus of seabirds with long wings and webbed feet, well-known as Gulls. Many species frequent our coasts, and of these the *Larus canus* is the commonest. It feeds on fish and carrion, is very voracious, and when frightened discharges the contents of the maw.

LAR'VA (a mask: *Lat.*), in Entomology, the grub or caterpillar state of an insect; the stage in the metamorphosis of an insect which it assumes on issuing from the egg, and before it becomes a pupa. The term is also applied to the early stage of lower animals.——LARVA, among the ancient Romans, a spectre, often represented under the form of a skeleton; or an old man, with shorn locks and a long beard, and carrying an owl on his hand.

LARYNGO'SCOPE (*larugx*, the throat; and *scopeo*, I see, *Gr.*), an instrument for examining visually the parts within the larynx. It consists of a concave reflecting mirror, its centre perforated with an aperture through which the surgeon looks. This is held before his eye, by means of a handle which is grasped by the teeth. A column of light from a lamp placed in a suitable position is reflected from the mirror, and thrown into the patient's open mouth, whilst a metal speculum is introduced therein, and held above the larynx. Any image thrown upon the metal speculum is clearly seen by the surgeon looking through the perforation in the mirror before his eye.

LARYNGOT'OMY (*larunx*, and *temno*, I cut: *Gr.*), in Surgery, the operation of cutting the larynx or windpipe, for assisting obstructed respiration, or removing foreign bodies.

LA'RYNX (*larugx: Gr.*), an organ of the voice, being a cartilaginous cavity which is connected with the windpipe, and on the size and flexibility of which depend the powers and tones of the human voice. The superior opening of the larynx is called the *glottis*.

LASCAR', in the East Indies, a native seaman.

LAS'SITUDE (*lassitudo*, weariness: *Lat.*), among Physicians, a morbid sensation of languor which often precedes disease.

LAST (*hlæstan*, to load: *Sax.*), a measure or weight of different amount in different places, and with regard to different articles. It is, however, generally estimated at 4000 lbs.

LATEEN' SAILS, triangular sails with very long yards, much inclined to the horizon. They are frequently used by xebecs, polacres, settees and other vessels navigated in the Mediterranean.

LA'TENT HEAT (*latens*, lying hid: *Lat.*), an expression formerly employed under an erroneous theory to signify heat in combination, in distinction from *sensible* heat; the portion of heat which seems to disappear when a body changes its form from the solid to the fluid, or from the fluid to the aeriform state, &c. [See HEAT.]

LAT'ERAN COUN'CILS, councils held in the basilica of the church of St. John Lateran, at Rome. Eleven have been held in this basilica, four of which are considered by the Roman Catholics as general. This church derives its name from the Roman family of the *Laterani*, who had on its site a palace which was seized by Nero, and made an imperial residence.

LAT'ERITE (*later*, a brick: *Lat.*), a red brick-like rock, composed of alumina and oxide of iron. It occurs between layers of basalt in volcanic countries.

LATERI'TIOUS (same *deriv.*), of a brick-red colour.

LATEX (juice: *Lat.*), in Botany, the elaborated or descending sap, a granular fluid which flows along tubes called *laticiferous* vessels.

LATH (*lætta: Sax.*), in Carpentry, a long thin piece of wood, nailed to the rafters of a wall or roof to receive the plaster or covering.

LATHE, an engine used in turning wood, ivory, and other materials.——A term applied in Kent to part of a county, containing three or four hundreds.

LATICLA'VE (*latus clavus: Lat.*), the broad purple stripe which the Roman senators and patricians were allowed to wear on the toga.

LAT'IN, the language spoken by the ancient Romans, or the inhabitants of Latium, from which it derives its name.

LAT'ITAT (he lurks: *Lat.*), in Law, a writ formerly used in personal actions where the party had to be arrested in any other county than Middlesex. It derived its name from a supposition or fiction that the person concealed himself, and could not be found in Middlesex, the county where the court sat.

LAT'ITUDE (*latitudo*, breadth: *Lat.*), in Geography, the distance of any place from the equator, measured in degrees, minutes, and seconds, upon the meridian of that place. It is either north or south, according as the place is situated on the north or south side of the equator.——In Astronomy, the distance of a star north or south of the ecliptic.

LATITUDINA'RIAN (same *deriv.*), one who admits a latitude in belief and in the interpretation of the Scriptures.——In a general sense a latitudinarian is one who is not restrained by precise settled limits in opinion.

LATRI'A (*latreia*, divine worship: *Gr.*), the highest kind of worship, or that paid to God: distinguished by the Roman Catholics from *dulia*, or the inferior worship paid to saints.

LATRO'BITE, a mineral of a pale red colour, massive or crystallized: found in an island near the Labrador coast. It is a silicate of alumina, with lime, potash, and oxide of manganese.

LAT'TEN (*laiton: Fr.*), plates of brass or bronze, reduced to different thicknesses, according to the uses for which they are intended. Tinned iron is sometimes called *latten*.

LAUD'ANUM (*laudo*, I praise: *Lat.*, from its excellent qualities), in Medicine, a liquid preparation of opium.

LAUDS (*laudo*, I praise: *Lat.*), in the Roman Catholic church, prayers formerly said at daybreak, but now joined to *matins*.

LAUNCE-FISH, or **SAND LAUNCE**, the name given to two species of fish belonging to the genus *Ammodytes*, which are taken upon the British coasts. They bury themselves in the sand when the tide retires, and are dug out by the fishermen for bait.

LAUNCH, a particular kind of flat boat, used in underrunning the cables of ships. It is the largest of a man-of-war's boats.

LAURA'CEÆ, a natural order of exogenous trees, having flowers without petals and anthers which open by recurved valves to set the pollen free. Most of the species are aromatic and fragrant. To this order belong the CINNAMON, CAMPHOR, and SASSAFRAS trees, as well as the Laurels. [See LAURUS.]

LAU'REATE (*laureatus*, crowned with laurel: *Lat.*). In England the *poet laureate* was formerly an officer of the royal household, whose business was to compose a birth-day ode for the monarch, and another for the new year. These obligations have been dispensed with: and the honour of the laureateship, with the salary, is now given as the reward of high poetic genius.

LAUREA'TION (same *deriv.*), in the Scotch universities, the act of taking the degree of master of arts, which the students are permitted to do after four years' study

LAURENTIAN SYSTEM, in Geology, a series of palæozoic strata of considerable thickness, forming the oldest known strata of our globe. They have been found in Scotland, the United States, and Canada, in which colony they occupy an area of 200,000 square miles. They consist chiefly of metamorphic rocks (gneiss, quartzites, and schists), and are traversed by numerous dykes of granite, syenite and greenstone. It was supposed that they were destitute of organic remains, but a few invertebrate fossils (a coralline and some rhizopodous shells) have been recently discovered in their limestones. This system, which derives its name from the river St. Lawrence, lies under two other formations of similar character (the Labrador and Huronian series) both older than the Silurian.

LAU'RUS (*Lat.*), in Botany, a genus of plants belonging to the nat. ord. *Lauraceæ*. ——*Laurus nobilis*, the sweet bay tree, a native of Italy, but cultivated in our gardens and shrubberies as a handsome evergreen. It is the laurel which was sacred to Apollo, and was used for garlands.

LA'VA, the melted matter that flows from volcanoes, and solidifies to stone. Basalt is ancient lava.

LAVAN'DULA (from *lavo*, I wash: *Lat.*, from its being anciently used in baths and fomentations), in Botany, a genus of plants, nat. ord. *Labiatæ*, containing the *Lavandula Spica*, or common lavender, a plant cultivated in our gardens on account of the fragrance of its flowers. The essential oil, obtained from it by distillation, is of a bright yellow colour, of a very pungent taste, and possesses, if carefully distilled, the fragrance of the lavender in perfection.

LAW (*loi: Fr.*), a body of rules applicable to a given subject; also, a single one of those rules. The term has, therefore, a *collective* and a *particular* meaning. Whenever certain events invariably follow certain antecedents, we use the word *law* metaphorically, to express this invariable sequence. Thus we say the *law of gravitation*, the *laws of motion*, &c. In its strict sense, law is 'a command issued by a superior, imposing an obligation on an inferior.' *Human law* is comprehended under several heads:—The *law of nations* comprises the rules respected by the mutual consent of Christian nations, but seldom voluntarily infringed, and when infringed, considered to require reparation. They relate to the intercourse of nations in peace, the grounds of just war, the limits of lawful hostility, the rights of conquest, the privileges of ambassadors, &c. *Positive* or *municipal law* is a rule of civil conduct, prescribed by the supreme power in the state, commanding what is right, and prohibiting what is wrong; it comprehends the duties of individuals towards the community, and towards each other. Sometimes laws are enacted to explain other laws, sometimes to suit particular emergencies. Municipal law is in some cases supposed to have the immediate sanction of heaven. Thus, in Mohammedan governments, the code of law is found altogether, or principally, in the Koran. The Hindoos also, and some other nations, pretend to a religious sanction for their laws. *Roman law*, as collected and digested in the *pandects*, *code*, and *institutes* of the emperor Justinian, is the great foundation of most of the laws used in the states of modern Europe, and constitutes the *civil law*, which in England is chiefly confined to ecclesiastical matters. *Canon law* consists of the rules framed by the Christian church for its own spiritual guidance. In Roman Catholic times, it consisted of edicts of popes, decrees of councils, and authoritative declarations of fathers and doctors of the church. The canons of the Protestant church were enacted in 1603. The *common law of England* (in contradistinction from civil law, and from equity) consists in a certain portion of our laws, relating to a definite subject-matter, and administered in courts which follow certain rules of evidence and modes of procedure. But, used in contradistinction from *statute law*, which is of positive enactment, it means the ancient customary law, as set forth in the writings of the early jurists and in the reported judgments of the bench. Since, in its popular sense, com mon law is opposed to equity and ecclesiastical law, it comprises the whole of both *civil* and *criminal* law, as administered by courts having trial by jury, with all subjects which come under the jurisdiction of the common law courts of Westminster Hall, and the various jurisdictions, not exercising equitable authority, throughout the country. *Equity* was no doubt originally a jurisdiction of a remedial character to moderate the rigour of legal judgments, according to the conscientious opinion of the judge; but, at present, its rules are as accurately laid down by precedents as those of common law. *Maritime law* is that which relates to harbours, ships, and sailors. *Martial law* is that proclaimed by authority of parliament, on an emergency of rebellion, invasion, or insurrection; it puts under the cognizance of *courts-martial* a variety of matters not ordinarily appertaining to them, that they may be tried in a summary way; and is generally accompanied by the power of arresting, detaining, and summarily trying suspected persons. *Military law* is that administered by courts-martial under the authority of parliament, the mutiny act, &c.

LAWN (*linon: Fr.*), a superior kind of linen cloth. It was formerly made only in France and Flanders; but at present the lawn manufacture is brought to great perfection in Scotland and Ireland, where it bids fair to rival our foreign competitors.

LAY (*laikos*, from *laos*, the people: *Gr.*), an epithet in ecclesiastical law for what belongs to the people, in contradistinction from that which belongs to persons in orders. The term is used also by clergymen and lawyers, to indicate persons not belonging to their respective professions.——LAY BROTHERS and LAY SISTERS, in the Roman Catholic church, are such as perform the secular and servile offices in a monastery or convent.——LAY CORPORATION, any corporation or body which consists of laymen, created for some temporal purpose: such as charitable corporations, which are constituted for the perpetual distribution of the free alms of the founder.——LAY FEE, lands held in fee of a lay lord, as distinguished from those lands which belong to the church.——LAY IMPROPRIATION, the impropriating or applying the revenues of the church to the use of a layman.

LAY'ER (*Lager*, pressed down: *Ger.*), in Horticulture, a young shoot or twig bent down and covered with mould, for growth or propagation. This operation is performed by slitting or notching the branches, or by twisting them, and then laying them under the mould, the ground being first made very light. After being laid, they are watered. The slitting or notching obstructs the return of the sap from the leaves, and causes its accumulation at the wounded part, when roots are produced in consequence of the efforts of nature to perpetuate life.

LAY FIG'URE, among Painters, a structure usually of wood made to imitate rudely the human form. It is provided with joints so that it may be put into any attitude or posture. Its principal use is for adjusting drapery.

LAZARET'TO (*Ital.*), an hospital for the reception of those afflicted with contagious diseases. In some places, lazarettos are set apart for the observance of quarantine.

LAZO or LASSO (*Span.*), an implement employed by the Spaniards of South America for catching wild animals. It consists of a long and very strong rope made of raw hide, one end of which is attached to the saddle (for it is used when the man is on horseback) and the other carries a small metal ring by which a noose can be formed. When it is about to be used the noose, with a diameter of about eight feet, is whirled round the head, and dexterously kept open. The hunter gallops after his prey, and at the proper moment flings the noose so that it will unerringly catch a bull by the horns, and with the aid of his well-broken horse stop it in full career.

LAZ'ULITE, a mineral of a slight indigo-blue colour, generally granular or occurring in small pieces not exceeding the size of a hazel-nut. It is found in narrow veins, traversing clay-slate, with quartz, in Salzburg; and consists of alumina, silex, magnesia, lime, and oxide of iron.

LEAD (*læd: Sax.*), in Mineralogy, a metal found in considerable quantity and widely distributed, but seldom, if at all, in the pure metallic state. It is of a bluish-grey colour, and very brilliant when fresh cut, but soon tarnishes from exposure to the air. It is the softest and least elastic of all the metals; is easily flattened under the hammer; and is ductile in a very great degree, though much less so than gold. It may easily be cut with a knife, and stains the fingers bluish-grey when rubbed. Its specific gravity is 11·45. Lead fuses at about 600° Fahr., and renders other more refractory metals fusible. It becomes fluid long before it is red-hot, which is the case with no other metal, except tin; after melting, it very readily changes to an oxide of a grey colour, which, if the fire is increased and the mass is often stirred, assumes a yellow, and afterwards a fine florid red colour: this is the *minium* or common *red lead* of the shops. If the heat is rendered yet more intense, it runs into an oleaginous mass, which, as it cools, becomes of a yellowish or reddish colour, and is composed of a number of thin laminæ: this is *litharge*. These several substances have nothing of the appearance of the metal from which they are produced; yet, if a little iron-filings be added to them over the fire, or some pieces of charcoal or any other inflammable matter be thrown into them while they are hot, they become lead again, their oxygen being removed by the combustible substance. *Massicot*, the yellow oxide of lead, is soluble in many acids, and forms salts, of which the acetate and carbonate are the most important, the latter being, under the name of *white lead*, the basis of white oil-paint. The sulphuret is the most common ore of lead, and is the *galena* of mineralogists. It is roasted to expel the sulphur, which is driven off in the shape of sulphurous acid. Perfectly pure water soon corrodes lead, the oxygen it contains in solution forming an oxide, and its carbonic acid a carbonate. But river, and other waters holding sulphates, and carbonates in solution, have no such effect; they cover its surface with a thin coating, which entirely protects it. As a portion of this coating is carbonate of lead, iron or zinc pipes, in connection with it, may be a source of danger: the galvanic action causes alkaline matter to be evolved on the lead, which renders the oxide and carbonate soluble, and therefore in a state to be injurious Persons, like painters, whose trades require them to come very much in contact with preparations of this metal, sometimes suffer very severely from the effects of slow poisoning by it. The *painter's colic* is a very common and a very dreadful disease. Also, the acidity of sour wines, &c., is often most nefariously corrected with sugar of lead, a highly poisonous substance. Sulphuretted hydrogen affords a most delicate test for lead, since it will blacken, or at least darken, any fluid containing even a minute quantity of a salt of lead in solution In 1861 there were 390 lead mines worked in the United Kingdom, and the quantity of lead obtained from the ore raised during the year amounted to 65,634 tons of the value of 1,445,255*l.* ——LEAD FOR SOUNDING. The common hand lead weighs 11 lbs, and has about 20 fathoms of line: the deep sea lead weighs 28 lbs. The line is marked specially at 5, 7, 10, 13, 17, and 20, and the numbers between these are called *deeps*· hence they say, 'By the *mark* 7,' meaning 7 fathoms, and 'By the *deep* 9,' meaning 9 fathoms The *common lead* is heaved from the side, the *deep-sea lead*, from the fore-part of the vessel, and generally when the ship is heaved to

LEAF (*Sax*), an expansion of the bark of a plant It consists of cellular tissue or parenchyma through which vascular tissue in the form of veins, ribs, and nerves, ramify, the whole being covered with epidermis through which in most cases pass minute orifices, called *stomata*. Leaves are either sessile, that is, directly seated on the branch, or petiolate, that is, furnished with footstalks or petioles. The angle formed by the leaf and the branch is called the axil, and here it is that new leaf-buds usually appear. The young leaf is generally protected by some sort of sheath called a *stipule*, which drops off when the leaf has expanded. When leaves fall annually, they are styled deciduous, otherwise they are evergreen. The functions of leaves seem to be to expose the sap to the air and light, whereby it becomes elaborated and fitted for the formation of wood, new leaves, &c.

LEAF'-BUD, the rudiment of young branches, made up of scales surrounding a minute axis, which directly communicates with the cellular tissue of the stem. Stimulated by light and heat, they form branches or, if artificially removed from the plant, they serve to multiply the individual from which they have been taken.

LEAGUE (*lieue: Fr.*), a measure of length. The *sea league* is three nautical or geographical miles, or the twentieth of a degree: that is, about 3·45 English statute miles.——LEAGUE (*ligue: Fr.; from ligo*, I bind: *Lat.*), in Politics, a treaty of alliance between different states or parties, entered into for the execution of some common enterprise. It may be *offensive* or *defensive*, or both. It is *offensive* when the contracting parties agree to unite in attacking a common enemy; *defensive*, when the parties agree to act in concert in defending each other against an enemy.

LEAK'AGE (*Leck*, a leak: *Ger.*), in Commerce, an allowance, intended to compensate for the leaking of casks, or the waste of liquors by leaking

LEAP YEAR (*hleapan*, to jump: *Sax.*). [See BISSEXTILE]

LEASE (*laisser*, to allow: *Fr.*), in Law, a demise of lands or tenements, generally in consideration of rent or other annual recompense, for a term of years, for life, or at will. The party letting the lands, &c., is called the *lessor*, and the party to whom they are let, the *lessee* The lease must be for a shorter term than that during which what is leased belongs to the lessor, since, if it be for his whole term, it is not a lease, but an *assignment*.——LEASE AND RELEASE, in our law, two deeds by which in conjunction a freehold estate in lands and tenements could be conveyed. This form of conveyance was originally devised by lawyers as a means of *secret conveyance*. Land was made over to the purchaser by bargain and sale for a year: this did not require registration. Then the purchaser received a release of all the vendor's remaining interest The necessity for executing the lease for a year has been abolished by act of parliament.

LEASH (*lasse*, a string: *Fr*), in Sporting, the number three; as a *leash* of birds, a *leash* of greyhounds, &c. Also, a leather thong, by which a falconer held his hawk.

LEATH'ER (*Leder; Ger*), the prepared skins of animals. Tanning renders skin strong, tough, durable, and often waterproof, and prevents its putrefaction. In tanning, the skins are first cleaned of hair and cuticle: they are then impregnated either with vegetable tan and extract, if *tanned* leather is to be produced, or with alum and other salts if *tawed* leather; and sometimes the two processes of tanning and tawing are both employed. Lastly, they are treated with oil, which is termed *currying*. Thick sole leather is tanned; white kid, for gloves, is tawed, upper leather, for boots and shoes, is tanned and curried; fine Turkey leather is tawed, and afterwards slightly tanned. [See TANNING.]

LEAV'EN (*levo*, I make light: *Lat.*), a piece of sour dough, used to ferment, and render light a much larger quantity of dough or paste. During the seven days of the passover, no leaven was permitted to be in the houses of the Jews.

LECTISTER'NIUM (*Lat*: from *lectus*, a couch; and *sterno*, I prepare), a religious ceremony, used by the ancient Romans in times of great public calamity. It consisted in inviting the gods to an entertainment, their statues being taken down from

the pedestals, laid on couches and placed at table, while the attendants gravely put the viands to their lips,

LED'GER, the principal book used by merchants, in which every customer's particular account is kept: that into which a summary of the journal is carried.——LEDGER-LINES, in Music, those lines added to the usual stave of five lines, when more are wanted for notes ascending or descending.

LEE (*lee: Ger.*), a sea term for the quarter opposite to that from which the wind comes.——*Lee-board*, a small platform of planks, which, being let down into the water on the lee-side of flat-bottomed boats, opposes the tendency of the wind to drive them to leeward.——*Lee-lurch*, a sudden and violent roll of the ship to leeward in a high sea.——The *lee side* of a ship is the opposite of that on which the wind blows when it crosses her course, and which is called the *weather side*.——*Lee-shore*, a shore on the lee side of a ship.——*Lee-tide*, a tide running in the same direction as that in which the wind blows.——*Lee way*, the deviation of the course actually run by the ship from the course steered upon; the ship being generally impelled sideways as well as forwards by the action of the wind or currents.——*Leeward*, pertaining to the quarter towards which the wind blows. The terms *leeward* and *windward* were given to the West Indian islands, with reference to their situation in a voyage from the ports of Spain to Carthagena or Portobello.——*Under the lee of a ship*, on the side of it opposite to that on which the wind blows.——*Under the lee of the land*, near the shore which breaks the force of the wind.

LEECH (*læc: Sax.*). [See HIRUDO.]

LEG'ACY (*lego*, I bequeath: *Lat.*), in Law, a bequest or gift by will of any personal effects; a testamentary gift of real property being a *devise*. The person bequeathing is called the *testator*, and he to whom it is bequeathed the *legatee*. There is also a *residuary legatee*, or one to whom, after the several devises or bequests made by will, the residue of the testator's estate and effects are given. A *general* legacy is one not referring to any particular thing of the kind, as where a diamond ring, but not a particular ring, is bequeathed. A *specific* legacy is a bequest of a particular thing, as distinguished from all others of the same kind, as a bequest of 'the diamond ring which was given me by A.' A legacy is *demonstrative* when it is in its nature a general legacy; but there is a particular fund pointed out to satisfy it. *General* legacies are subject to a rateable abatement if the estate will not pay all in full. But a *specific* legacy is subject to no abatement, except that which may be required by payment of debts. A specific legacy may, however, be *adeemed*, that is, taken away: thus, if a particular horse is left to any one, but is sold by the testator before his death, that legacy is adeemed; if 100*l.* in consols is bequeathed, but it is afterwards transferred by the testator to another stock, that legacy also is adeemed. A *demonstrative* legacy does not abate with the general legacies, and is not liable to ademption by the non-existence or alienation of the fund pointed out for satisfying it. If a general legacy is bequeathed, no certain time of payment being mentioned, the legatee will be entitled to interest on his legacy from the expiration of a year after the death of the testator. That time is allowed an executor to ascertain if there be any debts; and if a legacy has been paid, the legatee must refund, should it be necessary for the payment of a debt, even though the year have expired. When the legatee is an infant child of the testator, he will be allowed interest for maintenance from the time of the death of the testator. If the legacy given is payable at a certain day, it must be paid along with interest from that day; but the executor is not bound to pay it before the year is expired, though the day mentioned is earlier than that time. If the legatee dies before the testator, his legacy lapses, unless he was a child of the testator and has left issue.

LEG'ATE (*legatus: Lat.*), the pope's ambassador to foreign countries: usually either a cardinal or a bishop. The power of a legate is sometimes given without the title. It was one of the ecclesiastical privileges of England from the Norman conquest that no foreign legate should be sent here, unless the king desired it upon some extraordinary emergency, as when a case was too difficult for the English prelates.

LEGA'TION (*legatio*, an embassy: *Lat.*), a term denoting the body of official persons attached to an embassy. Hence *secretary of legation*.

LEGA'TO (tied: *Ital.*), in Music, a word used in an opposite sense to *staccato*, and implying that the notes of a movement or passage are to be performed in a smooth and gliding manner.

LE'GEND (*legendum*, to be read: *Lat.*), a book used in the ancient Roman Catholic churches, and containing the lessons which were to be read. The word was afterwards employed to denote a chronicle or register of the lives of saints; and as these histories were filled with ridiculous stories, the offspring either of credulity or fraud, the name *legend* was given to improbable or incredible fables that make pretensions to truth.——LEGEND, the motto engraved upon medals, which differs from the *inscription* properly so called. The latter signifies words placed on the reverse of a medal in lieu of figures; but the former, those round the head or other figure.

LE'GERDEMAIN (light of hand: *Fr.*), tricks which, from the dexterity of the performer, are made to deceive the observer, and are called *sleight of hand*.

LE'GION (*legio: Lat.*), in Roman Antiquity, a body of soldiers in the Roman army, consisting of different numbers at different periods. In the war with Hannibal it was 5000; after this it was increased to, in some cases, 6000 or 6200; but the cavalry always remained the same. The number of legions kept in pay together also differed according to times and occasions. Each legion was divided into ten cohorts, thirty maniples, or sixty centuries;

hence, if the century always consisted of 100 men, the legion would contain 6000. The 300 cavalry attached to a legion were divided into ten *turmæ* or troops, and each troop into three *decuriæ*, or bodies of ten men each. Originally the legion was drawn up in three lines: the *hastati*, or first line, were young men in the flower of life, and were at first armed with spears (*hastæ*), whence the name; the *principes*, or second line, were men in the prime of life; and the *triarii*, or third line, were veteran soldiers. To these were afterwards added the *velites*, or skirmishers. Each legion was, as it were, a separate army, having its cavalry and light infantry, with the various warlike engines then in use; and this arrangement had so many advantages that it was revived by the elder Napoleon, who even made his legion to consist of the same number as the Roman. His had the advantage of artillery. The 24 *tribuni militum* were the chief officers of the legion, and its principal standard was a silver or bronze eagle. The legions were named according to the order in which they were raised, from their commanders (as the *Claudian legion*), or from the place where they were stationed, &c. Under Augustus there were 25 legions; under Alexander Severus, 32.

LE'GION OF HON'OUR, an order instituted by Napoleon, while consul (May 19, 1802), for military and civil merit. It consisted of different grades, as grand crosses, crosses, commanders, officers, and legionaries; all of whom received pensions with this mark of distinction. After the restoration of Louis XVIII., the order underwent some modifications, and the number of its members was diminished.

LE'GISLATURE (*legis*, of a law; and *latia*, a proposing: *Lat.*), that body in a state which is empowered to make laws. [See CONSTITUTION, COMMONS, PARLIAMENT, &c.]

LEGIT'IMACY (*legitimus*, lawful: *Lat.*), in Politics, in its strict sense, means the accordance of an action or an institution with the municipal law of the land. In the language of modern politics, the term has been used with reference to the old hereditary dynasties, and in contradistinction from those founded by recent wars and revolutions. But it is now very generally held that municipal law, or peaceable possession, affords the only right to a throne; and that all governments become legitimate as soon as they are thoroughly established.

LEGU'ME (*legumen*: *Lat.*), in Botany, a one-celled, one or many-seeded, two-valved superior fruit, dehiscing by a suture along its face and its back, and bearing its seeds on the ventral suture only. The fruit of the pea and bean is a legume. It is sometimes indehiscent, as in the *Cassia Fistula*; but the line of dehiscence in such species is indicated by the presence of sutures. In many genera it passes into a *drupe*.

LEM'MA (*lemma*, from *lambano*, I take *Gr.*), in Mathematics, a preliminary proposition which serves to prepare the way for the demonstration of some other.

LEM'MING (*Leming*: *Ger.*), the *Myodes Norvegicus* of Zoologists, a rodent animal allied to the rat, very abundant in the north of Europe, and on the shores of the Arctic ocean. It is as large as a rat, and is covered with a black and yellow fur. Lemmings occasionally migrate in such vast bodies as to devastate the country through which they pass. In these emigrations they move in a straight line, regarding neither rivers, mountains, nor any other obstacle.

LEM'ON (*limon*: *Fr.*), the fruit of a spiny tree, the *Citrus Limonum* of Botanists, a member of the orange order. It was originally brought from the tropical parts of Asia, but now grown in the south of Europe and other warm climates.——The preparation called *salt of lemons*, &c., used to remove ink-stains from linen, is binoxalate of potash. Its effect is produced by the oxalic acid dissolving with facility the oxide of iron in the ink, on the combination of which with the tannin and gallic acid the colour depends; while, at the same time, it can be used without any risk of injury to the cloth, on which it has no effect.

LE'MUR (a ghost: *Lat.*), a genus of quadrumanous animals. Each of their four extremities is provided with an opposable thumb; but the index digit of the hinder hand has its nail developed into a long, curved, sharp-pointed claw. The lemurs differ from the typical quadrumana, and approximate to the ordinary quadruped, in their elongated pointed head and sharp projecting muzzle. They are all natives of Madagascar and the neighbouring islands. Though they belong to a hot climate, they are covered with fur; but this is necessary, since they move about in the night season, when, even in tropical climates, it is often very cold. They feed on fruits, insects, and small birds.

LEM'URES (*Lat.*), among the ancient Romans, spectres or ghosts, believed to be the souls of the dead, which tormented men in the night. In order to propitiate them, a festival named *Lemuria* was observed. The legend is that it was instituted by Romulus for his brother Remus, and was named by him, on that account, *Remuria*, which became corrupted into *Lemuria*.

LENS (a lentil: *Lat.*), in Optics, a thin piece of glass or other transparent medium, bounded on both sides by polished spherical surfaces, or on one side by a spherical, and on the other by a plane surface. These spherical surfaces may be either convex or concave; and, by combination, give rise to the following:—A *spherical lens*, or sphere; a *double convex lens*, or one having two convex surfaces, which causes rays of light to converge; a *plano-convex lens*, having one plane and one convex spherical surface, which also causes the rays of light to converge; a *double concave lens*, having two concave surfaces, which causes the rays of light to diverge; a *plano-concave lens*, having one plane and one concave spherical surface, which also causes the rays of light to diverge; a *meniscus*, having one convex and one concave surface, the radius of the concave being the larger—it causes the rays of light to converge; a *concavo-convex lens*, having also one convex and one concave surface, but the radius of the concave being the smaller—it causes the rays to diverge. The effect of a meniscus is the same as that of a convex lens of the same focal distance; and that of a concavo-convex lens, the same as that of a concave lens of the same focal distance. The focus of a concave lens is *imaginary*. The focus of a lens may be very conveniently found in practice, by ascertaining at what distance from it the sun's rays are concentrated to the smallest point. [See OPTICS, CONCAVE, &c.]

LENTIC'ULAR SCAL'PEL (*lenticulaire*: *Fr.*), a surgical instrument employed for removing the jagged particles of bone from the edge of the perforation made in the cranium with a trephine.

LENTI'GO (a freckle: *Lat.*), in Medicine, a freckly eruption on the skin.

LEN'TIL (*lens*: *Lat.*), the *Ervum* lens of Botanists, a leguminous herb. The seeds, which are contained in a pod, are round, flat, and rather convex in the middle. It is cultivated for its seeds, which afford a nutritious food, and also as fodder for cattle.

LEN'ZINITE, a hydrated silicate of alumina, found at Erfield in Prussia: it is white, translucent, and falls into small hard grains when put into water.

LE'O (a lion: *Lat.*), in Astronomy, one of the twelve signs of the zodiac, the fifth in order.

LE'ONINE VERSE, a kind of Latin verse, consisting of hexameters and pentameters, of which the final and middle syllables rhyme. According to some, it derived its name from one of the popes, Leo; according to others, from Leoninus, a monk of the 12th century. The following, which is the Latin paraphrase of a well-known doggrel verse, has been given as an example:—

'Dæmon languebat; monachus tunc esse volebat:
Ast ubi convaluit, mansit ut antè fuit.'

LEOP'ARD (*leo*, a lion; and *pardus*, a panther: *Lat.*), the *Leopardus varius* of Zoologists. The panther is now considered to belong to the same species, the only difference being that the leopard has small spots thickly set, whilst the panther's spots are large and open. But it has been found that there is so much variation in these respects that the distinction cannot be relied on. The species is a native both of Africa and Asia. The body of this fierce and rapacious animal is about four feet long. From the great flexibility of the limbs and spine, it can take surprising leaps, swim, crawl, and ascend trees. The hunting leopard of India is the CHEETAH.

LEPID'OLITE (*lepis*, a scale; and *lithos*, a stone: *Gr.*), a mineral of a granular and foliated texture, moderately hard, and of a pinkish colour. It contains *lithia*.

LEPIDOP'TERA (*lepis*, a thin flake; and *pteron*, a wing: *Gr.*), in Entomology, an order of insects comprehending the butterflies and moths. The maxillæ are modified into a spiral suctorial apparatus (hence they form a section of the transtelliate insects); they possess for the most part four large membranous wings, more or less covered with delicate scales; and their metamorphosis is complete. The abdomen of lepidopterous insects consists of six or seven annuli, and is attached to the thorax by a very small portion of its diameter. The females usually deposit their ova, often very numerous, on the vegetables that are to nourish the larvæ—which are well known as *caterpillars*—and perish soon after. Some species of larvæ attack woollen cloths, furs, leather, bacon, wax, &c. Some of them form societies, and live under a silken tent, which they spin in common. Caterpillars usually change their skin four times, before passing into the state of nymph or chrysalis: most of them spin a cocoon, in which they enclose themselves. The lepidoptera issue from their nymphal envelope through a slit which is effected in the back of the thorax.

LEP'ROSY (*lepra*, from *lepros*, rough: *Gr.*), a cutaneous disease, appearing in dry, white, thin, scurfy scales, either on the whole body or some part of it. The leprosy is of various kinds: that to which the Jews were particularly subject is supposed to have been elephantiasis, or black leprosy. The Jewish law, without excepting even kings, excluded lepers from communion with mankind, banishing them into the country or uninhabited places.

LE'PUS (a hare: *Lat.*). [See HARE.]

LE'ROI LE VEUT (the king wills it: *Fr.*). [See ASSENT.]

LETH'ARGY (*lēthargia*, from *lēthē*, forgetfulness: *Gr.*), a heavy unnatural slumber, sometimes bordering on apoplexy, from which it is difficult to rouse the patient. Sometimes it arises from a plethoric state, or from over-fatigue of mind.

LE'THE, in the ancient Mythology, one of the rivers of hell, signifying *oblivion* or forgetfulness; its waters having, according to poetical fiction, the peculiar quality of making those who drank of them entirely forget everything.

LETTER (*littera*. *Lat.*), a mark or character, written, printed, or engraved; used as the representative of a sound, or of an articulation of the human organs of speech. As sounds are audible, and communicate ideas by means of the ear, so letters are visible representatives of sounds, and communicate thoughts by means of the eye. It is not known by whom, or even by what nation, letters were invented. They are divided into *vowels* and *consonants*, and the latter into *mutes* and *liquids*. Diphthongs, also, are included in the classification.——LETTER OF ATTORNEY, called also *power of attorney*, in Law, a writing by which a person appoints another to do a lawful act in his stead, as to receive debts, &c.——LETTER OF CREDIT, among Merchants, a letter written by a merchant or banker to his correspondent abroad, requesting him to credit the bearer as far as a certain sum.——LETTER OF MARQUE, an extraordinary commission granted by the government to commanders of merchant-ships or others, in time of war, to make reprisals on the enemy. The ship so commissioned is also called a *letter of marque*. [See PRIVATEER.]——LETTERS-PATENT, writings to which is attached the great seal of England; so called because they are open. They authorize some act, grant some right, or confer some place or dignity. [See PATENT.]

LET'TISH, the language spoken in Courland and Livonia. With the Lithuanian, a language spoken in Eastern Prussia and the neighbouring part of Russia, it forms the Lettic division of the Indo-European or Aryan family.

LEU'CIN (*leukos*, white : *Gr.*), in Chemistry, a white pulverulent substance obtained from the fibres of beef, albumen, or casein, by boiling it in a strong solution of potash and neutralizing the liquid with sulphuric acid.

LEU'CITE (same *deriv*), a crystallized mineral, consisting of silica, alumina, and potash; of a grey or white colour, and generally opaque; somewhat like a *garnet* It occurs in *lava*, particularly that of Vesuvius: hence it has been termed *Vesuvian* or *volcanic garnet.*

LEUCOPHLEGMA'TIC (*leukophlegmatos :* from *leukos*, white ; and *phlegma*, phlegm : *Gr.*), in Medicine, an epithet for a dropsical habit, with a white bloated skin

LEUCO'THIOP (*leukos*, white ; and *Aithiops*, an Ethiopian : *Gr.*), an *albino*, or a white person of a black race

LEVANT' (*levante*, rising : *Ital*), a name under which are included Turkey, Syria, Asia Minor, Greece, Egypt, &c , washed by the Mediterranean and its contiguous waters The word is applied, in a general sense, to any country which is to the east of us.

LEVA'RI FA'CIAS (you will cause to be raised : *Lat*), in Law, a writ directed to the sheriff to levy a judgment debt upon the lands and goods of the party against whom it is issued ; and by virtue of which the sheriff may seize all his goods, and receive the rents and profits of his lands, till satisfaction be made. It is superseded, in practice, except in cases of outlawry, by a writ of *elegit*, which takes possession of the lands themselves.

LEVA'TORS (*levator*, a lifter : *Lat.*), in Anatomy, an appellation given to several muscles, whose office is to lift up the parts to which they are respectively attached.

LEV'EE (*lever*, to rise : *Fr* ,—because it was originally a visit paid to the sovereign, on his rising in the morning), a ceremonial visit to the sovereign, paid by the nobility, gentry, &c., to him. It is attended by gentlemen only, by which it is distinguished from what is termed a *drawing-room.* The Commander-in-chief of the Army and the Speaker of the House of Commons have also their levees.

LEV'EE-EN-MASSE (a universal rising : *Fr.*), a military expression for the patriotic rising of a whole people, including all those capable of bearing arms, who are not otherwise engaged in the regular service. It is the most formidable obstacle an enemy can encounter. In Germany it is called the *Landsturm*, in distinction from the *Landwehr*, or militia ; and in 1813 the governments of Northern Germany called it forth in every part of the country.

LEV'EL (*læfel* : *Sax.*), is an instrument for ascertaining when a line is at right angles to the direction of the gravitating force at any given place, and when consequently it lies in the plane of the horizon of that place. A *spirit level* is attached to the telescope of the *levelling instrument* by which engineers ascertain the difference of elevation between two points. Levelling may also be performed by the theodolite.——The art of *levelling* is particularly applied to the laying out grounds, regulating descents, draining morasses, conducting water, &c. ; and, in fortification, the reducing an uneven surface to that of a plane, so that the works may be of a corresponding height and figure.

LE'VER (*lever*, to raise : *Fr.*), in Mechanics, a rod moving about a centre or prop called a *fulcrum*, and having forces applied to two or more points in it. The lever is either *rectilinear*, as a balance-beam ; or *angular*, as a bell-crank. And its arms move in the *same plane*, as in the examples just mentioned ; or in *different planes*, as in the mechanism of organs, locomotives, &c. The lever also has *equal* arms, as in the common balance, where no mechanical advantage is gained ; or *unequal.* If unequal, the fulcrum is either *between* the extremities, or *at one* of them. When the fulcrum is between the extremities, whether equidistant from them or not, it is a lever of the *first order.* If the fulcrum is at one extremity, and the power at the other, it is a lever of the *second order.* If the fulcrum is at one extremity, and the weight or resistance at the other, it is a lever of the *third order.* Whatever the kind of lever, when there is equilibrium, the power is to the weight as the length of the arm on which the weight acts is to the length of the arm on which the power acts—provided the directions in which the power and weight act are perpendicular to the arms of the lever ; otherwise, the power is to the weight as the length of a perpendicular from the fulcrum to the direction in which the weight acts is to the length of a perpendicular from the fulcrum to the direction in which the power acts.

LEVIGA'TION (*levigatio*, a smoothing : *Lat.*), the mechanical operation or process of grinding the parts of bodies to a fine paste, by rubbing them with the flat face of a stone called a muller upon another stone called the table or slab, or by analogous means. If the result is stirred in water, powders of different degrees of fineness may be obtained by separating those which subside in successive intervals of time.

LE'VITES, a term applied in Scripture to such of the tribe of Levi as were employed in the lower offices and ministries of the temple. In this particular, they were distinguished from the priests, who, being descended from Aaron, were likewise of the tribe of Levi. The Levites bore some resemblance in the tabernacle and temple of the Jews to the deacons among Christians. They were employed in bringing wood, water, and other necessaries for the sacrifice, and they sang and played upon instruments in the temple. They also applied themselves to the study of the law, and were the ordinary judges of the country, though always subordinate to the priests. Their subsistence was derived from the tithes of corn, fruit, and cattle, throughout Israel; but the priests were entitled to a tenth of their tithes, by way of first-fruits to the Lord.

LEVIT'ICUS, a canonical book of the Old Testament, so called from its containing the laws and regulations relating to the priests, Levites, and sacrifices. These duties, rites, and ceremonies formed what is termed the *Levitical law*.

LEV'ITY (*levitas*: *Lat.*), in Physics, the privation or want of weight in a body, when compared with another that is heavier, in which sense it stands opposed to *gravity*.

LEXICOL'OGY (*lexis*, diction; and *logos*, a description: *Gr.*), that branch of literature which treats of the proper meaning and just application of words.

LEX'ICON (*Gr.*), a book containing an alphabetical arrangement of the words of a language, with an explanation of the meaning of each.

LEY, in Chemistry, the solution of a caustic alkali: in ordinary language, the impure alkaline solution obtained from ashes, and rendered caustic by lime.

LEY'DEN JAR (from the place where its principle was discovered), in electrical experiments, a glass jar having the outside and the inside coated to a certain height with tin-foil. The glass under the foil can then be charged with the opposite electricities, which may be preserved in the same state for any length of time. But if a piece of metal be made to connect the two coatings the two charges instantly unite with violence.

LEZE MAJ'ESTY (*crimen læsæ majestatis*: *Lat.*), in Jurisprudence, any offence against the sovereign power of the state. Among the Romans, it comprehended rebellion, usurpation of office, &c.

LHER'ZOLITE, in Mineralogy, a variety of pyroxene, of an emerald-green colour, brilliant when crystallized, and translucent.

LIA'NAS, or LIA'NES (*liar*, to tie: *Span.*), the name given in Spanish America to twining plants which spread from tree to tree and render a tropical forest impassable—the Cable plants of the English.

LI'AS, in Geology, a secondary formation lying between the oolite and the trias, consisting of beds of argillaceous limestone, marl, and clay, richly stored with fossils. The name is an English provincial one, but it has been generally adopted by geologists. In England the lias forms an almost continuous band from the sea at Lyme Regis, in Dorsetshire, to the coast of Yorkshire, being only interrupted by the Mendip Hills in the southern and by the marshland at the mouth of the Humber in the northern part of this long range. At Whitby the strata consist of shales enclosing jet and large fragments of bitumenised wood. The lime obtained from some of the lias beds has the valuable property of hardening under water. In France and Germany the lias is also well developed. As to fossils, ammonites and other mollusca abound; fish are plentiful, but the most remarkable feature is the number of gigantic reptiles that have been discovered in this formation. [See ICHTHYOSAURUS, PLESIOSAURUS, PTERODACTYLE.]

LIBA'TION (*libatio*, from *libo*, I pour out: *Lat.*), among the Greeks and Romans, was an essential part of solemn sacrifices. It was also performed alone, as a drink offering, by way of procuring the protection and favour of the gods in the ordinary affairs of life. At sacrifices, after the libation had been tasted by the priest and handed to the bystanders, it was poured upon the victim. At entertainments, a little wine was generally poured out of the cup, before the liquor began to circulate, to show their gratitude to the gods for the blessings they enjoyed. The libations to the dead were not performed till the ninth day after the burning or interment; and consisted of milk, wine, or blood, and generally concluded the funeral solemnities.

LI'BEL (*libellus*, a little book: *Lat.*), in Law, the publication of written or printed matter which tends to degrade a man in the opinion of his neighbours, or to make him hated or ridiculous. Both the author and the publisher of a libel are liable to an action. Any book, pamphlet, writing, or picture, containing such representations, although only communicated to a single person, is considered in law a publication; and libellers may be brought to punishment by a prosecution, or be compelled to make reparation by a civil action. The latter is grounded upon the injury which the libel is supposed to occasion to the individual; the public prosecution, upon its tendency to provoke a breach of the peace. A person who sends a libel privately to the person libelled is indictable (but not actionable), because this proceeding has a tendency to cause a breach of the peace. Formerly it was immaterial, with respect to an indictment for libel, whether the matter of it was true or false, since the provocation, and not the falsity, was to be punished *criminally*; but it was otherwise in an action for *damages*. At present, however, in pleading to an indictment, the defendant may, by way of defence, allege the truth of the matters charged, and may show that their publication is for the good of society. Special provisions have been made for the benefit of editors and proprietors of newspapers and other periodical publications. Unless the intent is shown to be malicious, it is no libel to print or reprint parliamentary papers, or extracts from them. The jury are now authorized to decide not only on the publication and meaning of the libel but also on its criminality, which was formerly left to the judge. Libel is a greater offence than *slander*. Any person who with a view to extort money or to procure an appointment publishes, or threatens to publish, a libel, or offers to prevent the publishing of one, is indictable. In all indictments or informations by a private prosecutor for a *defamatory libel*, if judgment is given for the defendant, he is entitled to costs from the prosecutor.——LIBEL, in the Ecclesiastical and Admiralty courts, the formal written statement of the complainant's ground of complaint against the defendant.

LIBEL'LULA, in Entomology, a genus of neuropterous insects including the various species of DRAGON-FLY, which see.

LI'BER (the inner bark: *Lat.*), in Botany, the inner lining of the bark of exogenous plants. It is a mixture of woody and cellular tissue, and seems to be formed annually at the same time as the concentric zones of wood. It conveys downwards the secretions elaborated in the bark and leaves; and it is the principal seat of the laticiferous vessels. The liber layer of the Lime and some other trees affords material for cordage and mats. [See LACE BARK.] It is their liber which renders the flax, hemp, mallow, and nettle tribes valuable for manufacturing purposes. Sacks are made in Western India from a tree called *Antiaris saccidora* by cutting a thick branch, letting it soak a while in water, and then beating it with clubs until the liber and bark separate from the wood. They are then pulled inside out, and the wood is sawn off near the lower end, where a piece is left to form the bottom of the sack.

LIB'ERAL ARTS (*liberalis*, belonging to freedom: *Lat.*), such as depend more on the exertion of the mind than on manual labour. The term was first applied to them to distinguish them from the *mechanic arts*, originally exercised chiefly by slaves.

LIBER'TUS (a freedman: *Lat.*), in Roman Antiquity, a person who from being a slave had obtained his freedom. According to Suetonius, the *liberti* were such as had been actually made free themselves; the *libertini* were the children of such persons; but *libertinus* seems rather to mean one belonging to the *class* of liberti.

LIB'ERTY (*libertas: Lat.*), in general denotes a state of freedom, as distinguished from *slavery*, the power of living as a man pleases, or without being controlled by another. It is of various kinds:—1. *Natural* liberty, a state of exemption from the control of others, and from positive laws and the institutions of social life. 2. *Civil* liberty, the security from the arbitrary will of others, which is afforded by the laws. 3. *Political* liberty, civil liberty in a more extensive sense; it properly designates the freedom of a nation or state from all unjust abridgment of its rights and independence by another nation. 4. *Religious* liberty, or *liberty of conscience*, the right of forming one's own opinion on religious subjects and of worshipping the Supreme Being according to the dictates of conscience, unfettered by external control.——LIBERTY OF THE PRESS, the free power of publishing what one pleases; subject, however, to punishment for what is mishievous to public morals, or injurious to individuals. 'Men,' says Lord Macaulay, 'are never so likely to settle a question rightly as when they discuss it freely. A government can interfere in discussion only by making it less free than it would otherwise be. Men are most likely to form just opinions when they have no other wish than to know the truth, and are exempt from all influence either of hope or fear. Government, as government, can bring nothing but the influence of hopes and fears to support its doctrines. It carries on controversy ot with reason but with bribes and threats. If it employs reasons, it does so not in virtue of any powers which belong to it as a government. Thus, instead of a contest between argument and argument, we have a contest between argument and force. Instead of a contest in which truth, from the natural constitution of the human mind, has a decided advantage over falsehood, we have a contest in which truth can be victorious only by accident.'

LI'BRA (the balance: *Lat.*), in Astronomy, a sign of the zodiac: so called because, when the sun enters it, the days and nights are equal.——LIBRA, in Roman Antiquity, a pound weight; also a coin equal in value to twenty denarii.

LI'BRARY (*librarium: Lat.*), a word used to denote either a collection of books or the apartment or edifice for holding them. The first public library of which we have any certain account in history was founded at Athens by Hipparchus, 526 B.C.; the second of any note, at Alexandria, by Ptolemy Philadelphus, 284. The latter was burnt by the Roman army, 47 B.C., 400,000 valuable books being destroyed in the conflagration. A second library, formed from the remains of the first at Alexandria, by Ptolemy's successors, and said to have consisted of 700,000 volumes, was totally destroyed by the Saracens, at the command of the caliph Omar, A.D. 642. How many treasures of ancient lore were thus irremediably lost must ever remain unknown: but it is more than probable, when we consider the labour of transcribing, that a very trifling portion of the literature of remote ages has been preserved to us. The most valuable libraries in Europe, at present existing, have been stated to contain printed books and manuscripts as follows:—The Royal Library, Paris, 824,000 vols. and 80,000 MSS. The Bodleian Library, Oxford, 420,000 vols. and 30,000 MSS. The Royal Central, Munich, 800,000 vols. and 24,000 MSS. The Vatican, Rome, 100,000 vols. and 40,000 MSS. University, Göttingen, 300,000 vols. and 5,000 MSS. British Museum, nearly 700,000 vols. and 32,000 MSS. Vienna, 453,000 vols. and 16,000 MSS. St. Petersburg, 505,000 vols. and 21,000 MSS. Naples, 300,000 vols. and 6,000 MSS. Dresden, 300,000 vols. and 3,700 MSS. Copenhagen, 557,000 vols. and 30,000 MSS. Berlin, 460,000 vols. and 5,000 MSS. These numbers can be given only as approximations, since the number of works in the various libraries is continually augmented, and in some of them with great rapidity; but they serve to convey an idea of the vastness of these collections, as well as their relative magnitudes.

LIBRA'TION (*libratio*, a weighing: *Lat.*), in Astronomy, an apparent irregularity of the moon's motion, which makes her seem to librate about her axis, sometimes from the east to the west, at others from the west to the east; so that the parts in the western limb or margin of the moon sometimes recede from the centre of the disk, and sometimes move towards it, by which means they become alternately visible and invisible to the inhabitants of the earth. It is of three kinds:—1. Libration in *longitude*, which is ocasioned by the rotary motion of the moon about her axis not being always precisely equal to the angular velocity in her orbit. 2. Libration in *latitude*, which is occasioned by the inclination of the moon's axis of rotation to the plane of her orbit: her axis retaining the same direction in space, the poles of rotation and parts adjacent to them become alternately visible as she moves in her orbit. 3. *Diurnal* libration, which is a consequence of the lunar parallax: the spectator at the earth's surface observes points on the moon's disk at her rising, which disappear as her elevation increases, while new ones on the opposite border come into view as she descends.

LICEN'TIATE (same *deriv.*), in Law, one who has full license to practise any art or faculty; generally, a physician who has a license to practise granted by the College of Physicians. Cambridge is the only English university which grants the degree of *licentiate*, and that only in medicine.

LICHENOG'RAPHY (*leichên*, a lichen; and *grapho*, I write: *Gr.*), the science which illustrates the natural history of *lichens*.

LICH'ENS (*Lat.*; from *leichên*: *Gr.*), in Botany, an order of cryptogamic plants found in all parts of the world. They grow on the ground, on rocks and stones, and on tree trunks. They are frequently mere crusts of various bright colours; but often they rise up, and form small branches. They draw their nourishment from the air, not from the substance to which they are attached. The reproductive matter is of two kinds:—1. Spores, which are usually immersed in discs or shields that burst through the outer layer. 2. Minute cells, that are thrown off from an inner layer. Lichens are abundant in the temperate and cold parts of the earth. Many of them are of no known use; but some, as the reindeer moss (*Cenomyce rangiferina*), the Iceland moss (*Cetraria Islandica*), and several species of *Gyrophora* (*Tripe de roche*), are capable of supporting animal life. Iceland moss, when deprived of its bitterness by boiling, is an excellent food for invalids. Some lichens are used as medicines; thus, the *Variolaria faginea*. But their principal importance is as dyes, many of them affording brilliant colours; thus, orchil, cudbear, perolle, &c. 'Lichens,' says Mr. H. Y. Hind, 'grow with exceeding slowness, but retain their general form and vitality for very many years. They are truly "time-stains." They survive the most intense cold and live during long summer droughts in tropical climates. From the polar zones to the equator, under all conditions of heat and cold, on the most unyielding and barren rocks, on the living and the dead, wherever there is light, lichens grow.'

LIC'TORS (*lictores*, from *ligo*, I bind: *Lat.*), in Roman Antiquity, officers or beadles who carried the fasces before the chief magistrates whenever they appeared in public. It was also a part of their duty to be the public executioners in beheading, scourging, &c. A dictator was attended by twenty-four lictors; a consul by twelve; the master of the horse, and prætor, by six; and each Vestal virgin had one.

LIEGE (*lige*: *Fr.*), a term used chiefly in combination: thus, *liege lord*, one that acknowledges no superior, the chief lord of the fee; *liege man*, who owes homage and allegiance to the liege lord. By the term *liege people* are meant the subjects of a monarch, because they owe him their allegiance.

LI'EN (a bond: *Fr.*), in Law, the right which one person, in certain cases, possesses of detaining property belonging to another, when placed in his possession, until some demand, which he has, is satisfied. Liens are of two kinds: *particular liens*, that is, where the person in possession of goods may detain them until a claim which accrues to him in respect of those identical goods is satisfied; and *general liens*, that is, where the person in possession may detain the goods, not only for his claim accruing in respect of them, but also for the general balance of his account with the owners. Some liens are created by express agreement, and some by usage.

LIEUTEN'ANT (*Fr.*, literally one who holds a place), an officer who supplies the place and discharges the office of a superior in his absence. Of these, some are civil, as lord-lieutenants of kingdoms, and lord-lieutenants of counties; and others are military, as lieutenant-generals, lieutenant-colonels, lieutenants of horse, foot, or of ships of war.——*Lord-lieutenant of Ireland*, the chief executive officer of the Irish government, representing, in some respects, the person of the sovereign. He corresponds with the secretary for the Home Department; but the management of Irish affairs in London is chiefly committed to his chief secretary. His salary is usually 20,000*l.* per annum. He has the power of bestowing certain offices under the government, of creating knights, and of pardoning all crimes except high treason. Before the union, he summoned and prorogued the Irish parliament; but no bill could be passed without the royal assent.——*Lord-lieutenants of counties*, officers who, upon any invasion or rebellion, have power to call out the militia, and to give commissions to colonels and other officers, to arm and form them into regiments, troops, and companies. Under the lord-lieutenants are *deputy-lieutenants*, who have similar powers; these are chosen by the lord-lieutenants out of the principal gentlemen of each county, and presented to the sovereign for approbation.——*Lieutenant-general*, an officer next in rank to the general.——*Lieutenant-colonel*, the officer between the colonel and the major.——*Lieutenant*, in the army, the officer next below a captain. In the navy, an officer who ranks with a captain in the army: there are *first* and *second* lieutenants, with different pay.

LIFE (*liflan*, to live: *Sax.*), in a general sense, that state of animals and plants, or of any organized beings, in which their natural functions and motions are performed; or in which the organs are capable of performing their functions. The life of an animal body may be spoken of in a chemical and a physiological sense. Life is antagonistic to ordinary chemical action: the moment death occurs, decomposition begins, though it may not be at once perceptible: the stomach, on which, during life, the gastric juice has no action, is sometimes perforated by it after death. The following are the results of careful investigation, regarding the duration of human life:—1. The proportion of births to the actual stationary population of any place, expresses, or is relative to, the average duration of life in that population. For example, suppose this proportion to be in the ratio of one to twenty-eight, the average life of the inhabitants of the place will be found to be twenty-eight years. 2. The female sex enjoys at every period of life, except at puberty, at which epoch the mortality is rather higher among young females, a greater longevity than the male sex. 3. Pregnancy and labour occasion, indeed, a considerable loss of life; but this loss disappears, or is merged, in the general mass. 4. The so-called climacteric periods of life do not seem to have any influence on the longevity of either sex. 5. The average duration of life, at the present time, is in Russia about twenty-one years; in Prussia, twenty-nine; in Switzerland, thirty-four; in France, thirty-six; and in England, thirty-eight years. 6. The average duration of life has, in recent times, increased very greatly in most cities of Europe, which arises from greater cleanliness and better ventilation. 7. In reference to the influence of professions or occupations in life, it seems that ecclesiastics are, on the whole, the longest, and medical men the shortest livers: military men are nearly between the two extremes; but yet, proportionally, they, more frequently than others, reach very advanced years. 8. The mortality is generally greater in manufacturing than in agricultural districts. 9. Marriage is decidedly favourable to longevity. 10. The mortality among the poor is always greater than among the wealthier classes. 11. The mortality in a population appears to be always proportionate to its fecundity: as the number of births increases, so does the number of deaths at the same time.

LI'FE-BOAT, a vessel so constructed as to be capable of putting to sea in the most stormy weather, and withstanding the fury of a tempest; by means of life-boats many lives are annually saved from wrecks and vessels in distress. They are generally built wide and shallow, with the head and stern alike, that they may be rowed in either direction. They are cased round on the inside of the upper part with cork, to render them buoyant, although filled with water, and loaded with as many persons as can be placed in them; the cork also tends to preserve equilibrium, or to restore it. It is painted white, to be conspicuous on emerging from a hollow sea.

LI'FE-BUOY, a buoy with a mast, to render it conspicuous. It is thrown into the sea when any one falls overboard; and has usually attached to it a composition, which is fired by the very act of disengaging it from its place, and which burns with a strong light.

LI'FE-ESTATES, in Law, freehold estates not of inheritance.

LI'FE-GUARDS, the body-guard of a sovereign prince. There are two regiments of English life-guards, each having 32 officers, 53 non-commissioned officers, and 851 privates.

LIFTS, the ropes which support the ends of yards or booms against the weight of the men upon them.

LIG'AMENT (*ligamentum*, from *ligo*, I bind: *Lat.*), in Anatomy, a strong elastic membrane, connecting the extremities of the movable bones. Boiled in water, membranes yield more or less gelatine, and leave some insoluble albumen. They are divided generally into *capsular* ligaments, which surround the joints like a bag, and *connecting* ligaments.

LIG'ATURE (*ligatura*, from same: *Lat.*), in Surgery, a cord, band, or string of various thickness, covered with white wax; it is used for the purpose of tying arteries, veins, or other parts.——In Music, a line connecting notes.

LIGHT, in Physics, that peculiar property of matter which affects the nerves of sight, and causes us to see.——A *ray of light* is an exceedingly small portion of light as it comes from a luminous body. A *beam of light* is a collection of parallel rays. A *medium* is a body which affords a passage for the rays of light. A *pencil of rays* is a mass of diverging or converging rays. *Converging* rays are those which tend to a common point; *diverging* rays, those which come from one point, and continually separate as they proceed. The rays of light are *parallel*, where the lines which they describe are so. The *radiant point* is the point from which diverging rays proceed. The *focus* is the point to which the converging rays are directed. Light passes off from a luminous body in all directions; and its intensity decreases as the square of the distance increases: thus, if one object is twice as far from a luminous body as another of the same size, it will receive only one-fourth as much light as the latter. The velocity with which light travels is enormous; it was estimated, on astronomical data, at 183,470 miles per second; but according to Léon Foucault's recent experiments with the 'turning mirror,' it is 185,170 English miles per second; and it requires little more than a quarter of an hour to pass through the diameter of the earth's orbit. When light encounters an obstacle, some of it is reflected, some absorbed, and, if the interposed body is not opaque, some of it is transmitted. During transmission it is modified, being in some cases, as with doubly refracting crystals, decomposed into two white rays, possessing different properties; and in others, as with glass prisms, decomposed into a number of *coloured* rays, accompanied by rays which are colourless, and in fact *invisible*, but which have marked chemical and calorific properties. Light, heat, and the chemical principle seem to be modifications of the same element; but there are circumstances in which they differ:—a thin plate of glass will intercept much of the heat, but none of the light, of an ordinary fire; the quantity, however, of heat intercepted diminishes as its intensity is increased, and the rays from a body that is white-hot pass through it with but little interruption. On the other hand, obsidian and black mica allow free passage to the heat, but intercept all the light. Pale yellow glass intercepts all the chemical, but transmits all the luminous rays. Blue glass intercepts most of the luminous, but none of the chemical rays. Solar light may be considered to consist of two rays of *different polarities;* of three kinds of rays having different properties, the *calorific*, the *chemical*, and the *luminous;* and the last of three different colours, the *blue*, the *yellow*, and the *red*, from which all others are formed: white being due to the presence, and black to the absence, of all the colours. Two theories have been proposed regarding the nature of light, each capable of explaining all its phenomena, with perhaps the exception of *interference* [which see]. The one called that of *emission*, adopted by Newton, supposed light to consist of exceedingly minute particles of a peculiar matter thrown out by a luminous body. It seems most in accordance with chemical science, many experiments in which appear to show that light is actually combined in some instances with elementary substances, and in others liberated from them. Thus, when carbon and oxygen are united so as to form carbonic acid, light is set free; but when carbonic acid is again decomposed by the vegetable, light is required, seemingly that it may enter into combination. The other theory, called the *undulatory*, adopted by most modern philosophers, supposes light to be the vibration of some ethereal medium which pervades all space, just as sound is the vibration of atmospheric air. Astronomy furnishes us with some reason for supposing the existence of such a medium; and it is certain that we cannot as yet satisfactorily explain the phenemenon of *interference*, except by the undulatory theory.——*Effects of light on vegetables*. The change of position in the leaves of plants, at different periods of the day, is entirely owing to the agency of light, and that plants which grow in windows in the inside of houses, are, as it were, solicitous to turn their leaves towards the light. The more fully plants are exposed to the light, the *more colour* they acquire. Sir Humphry Davy found, by experiment, that red rose-trees, carefully excluded from the light, produce roses almost white.

LI'GHTHOUSE, a tower or lofty building on the sea-coast, intended to direct seamen in navigating ships at night, by the exhibition of a light which is of some definite intensity and colour, and which sometimes revolves or disappears at certain fixed periods. Lighthouses were used in very ancient times; that which was constructed on the isle of Pharos, opposite to Alexandria, was so celebrated, that it has given its name to all similar erections. It is said to have been 500 feet high; to have been visible at a distance of 45 miles; and to have cost 800 talents, or about 16,000*l.* of our money. The old mode of lighting a beacon was to burn wood or coal in a grate on the top; down to 1807, candles were burned in the Eddystone lighthouse. But, whatever materials are used, much of the light must be lost, unless means are taken to give it a horizontal direction. This may be effected by either a catoptric or dioptric apparatus, that is, either by reflection or refraction. When the *catoptric system* is used, the flame of an argand burner is usually placed in the focus of a parabolic reflector; and, to produce a light of sufficient intensity, eight lamps and mirrors are generally united, in such a way that the lights are blended into one. When the light is to revolve, the lamps are attached to a frame, which is moved round with the proper velocity by clockwork. If the *dioptric system* is employed, eight powerful lenses are fixed in a frame, their axis being in the same plane, and meeting in a common focus, in which the lamp is placed. Various methods have been devised for preventing a loss of the rays which pass above and below the lenses. When it is not a revolving light, the number of lenses ought to be, practically, infinite, that the light may be thrown to every part of the horizon. Thirty-two lenses have been used; but far more successful results are obtained by using a cylindric belt of glass, whose figure is generated by the revolution of the largest vertical outline of a powerful double convex lens round its focus. This belt is aided above and below by a series of prismatic rings or zones, which throw most of the remaining light also in a proper direction. The light is generally produced by an argand burner; and, as the dioptric system requires a more powerful lamp, a series of concentric burners is used—the number of these, with a first-class light, being four. Gas is sometimes employed, but all attempts to apply the Drummond or voltaic light have failed. *Red* is the only coloured light which causes a lighthouse to be recognised at a sufficient distance. Lighthouses are distinguished also by the *time of revolution* of their light. Some of them have a *flashing light*: that is, the flashes and eclipses succeed each other so rapidly as to give rise to the appearance of scintillations. An *intermittent light* is one that is suddenly eclipsed and as suddenly revealed, exhibiting an appearance very different from a revolving light. Sometimes there are two lights, one over or beside the other, or one *red* and the other *white*. Of late years magneto-electricity has been employed as the illuminating agent. the light thus produced being much more intense than any that can be obtained from a manageable number of oil-lamps or argand burners. At Dungeness, on the coast of Kent, there is a light of this kind. A small steam engine is employed to cause a number of soft iron cores, surrounded by coils of wire, to rotate past a series of large permanent magnets. The streams of electricity thus generated are collected and conveyed by a wire into the middle of the illuminating apparutus in the tower of the lighthouse. It is there made to pass between two points of charcoal, and in the act of doing this it produces a continuous spark of great brilliancy.

LI'GHTNING (from *light*), in Meteorology, a flash of light suddenly appearing in the atmosphere, and commonly disappearing in the same instant; sometimes attended with clouds and thunder. Lightning is produced by the passage of electricity from one body to another. Thunder is the explosion of clouds charged with it; and lightning is to thunder what the *flash* is to the *report* of gunpowder. Sometimes the electricity passes from one cloud to another; sometimes from a cloud to the earth, or *vice versâ*. The different forms of the flashes of lightning are all found in electric sparks; and the ordinary electrical experiments have all been performed with electricity drawn from the clouds.

LI'GHTNING CON'DUCTORS, metallic points elevated above the highest parts of buildings, and communicating by good and insulated conductors with the ground, or, which is better, with the nearest water. They are intended gradually to convey to the ground that atmospheric electricity which might, if transmitted suddenly, injure the building and its inmates. [See ATMOSPHERIC ELECTRICITY.]

LIGHTS, NOR'THERN. [See AURORA BOREALIS.]

LIG'NIN (*lignum*, wood: *Lat.*), a hard secondary deposit in vegetable cells, forming their wood or ligneous fibre. It is considered to be a modification of cellulose. It forms the chief part of the trunks of trees.

LIG'NITE (same *deriv.*), in Geology, *wood-coal*, fossil wood carbonized. It is chiefly found in strata of the tertiary era, and in some places there are large deposits of it. The lignites of Bovey Tracey, in Devonshire, are dug for fuel. Near Bonn, on the Rhine, there is a lignite deposit from which the pigment called umber is obtained. Lignite is wholly composed of land plants, and land and freshwater shells are found amongst them.

LIG'NUM VI'TÆ (the wood of life: *Lat.*), the wood of an American tree, the *Guiacum officinale* of botanists, nat. ord. *Zygophyllaceæ*. It attains the height of forty feet, and measures from fifteen to eighteen inches in diameter; having a hard, brittle, brownish bark, not very thick. The wood is firm, solid, ponderous, very resinous, of a blackish-yellow colour, and a hot aromatic taste. It is imported into England in large pieces of four or five hundredweight each, and, from its hardness and beauty, is in great demand for various articles of turnery, and for ships' blocks, &c. The wood, gum (called *Guiacine*), bark, fruit, and even the flowers, possess certain medicinal virtues.——Of Pegu, *Melanorrhœa usitata*.——BASTARD, *Sarcomphalus laurinus*.——NEW ZEALAND, *Metrosideros scandens*.——WHITE, *Badiera diversifolia*.

LIG'ULA (a slip or strip: *Lat.*), in Botany, a membranous appendage at the apex of the sheathing petiole of grasses. The florets of some composite plants, such as the daisy and dandelion, are said to have *ligulate* or strap-shaped corollas.

LIG'URITE, a mineral occurring in oblique rhombic prisms, of an apple-green colour occasionally speckled. As a gem, it resembles the *Chrysolite*.

LI'LAC (*lilach: Turk*), a well-known shrub with fragrant flowers, a native of Persia. It belongs to the genus *Syringa*, nat. ord. *Oleaceæ*.

LILIA'CEÆ (*lilium*, a lily: *Lat.*), in Botany, a nat. order of bulbous-rooted herbaceous plants, distinguished from the *Amaryllis* order by having the ovary above the base of the calyx, and from the *Iris* order by having six stamens. It includes a great number of plants with handsome flowers, such as the true lilies, the tulips, day lily, squills, lily of the valley, asphodels, and aloes. To this order also belong the asparagus, onion, and garlic, as well as the dragon tree.

LIL'Y (*lilium: Lat.*; from *leirion: Gr.*), in Botany, a genus of plants with a bulbous and perennial root, the flower of which is six-petalled and campanulate. The lily is reckoned by Pliny the noblest flower next to the rose; and, according to Dioscorides, it was a royal flower.——*Lily of the Valley*, a plant of the genus *Convallaria*, with a monopetalous, bell-shaped corolla.

LIMB (*limbe: Fr.*; from *limbus*, a border: *Lat.*), in Astronomy, the utmost edge or border of the body of the sun or moon.——In Botany, the expanse of the leaf, as distinct from the stalk. Also the broad upper part of a petal, as distinguished from the lower narrow part.

LIME (*Leim: Ger.*), in Mineralogy, a very useful earth, existing in great abundance in nature. It is usually combined with carbonic acid in the forms of limestone, marble, and chalk, which, when burnt, become lime. It consists of oxygen and a metallic base called calcium. It is the basis of the bones, shells, and other hard parts of animals. Sprinkled with water, it heats, falls into powder, and becomes a hydrate; the same effect takes place gradually in the air. It is white, very difficult to be fused, and highly luminous when raised to a high temperature. It is more soluble in cold than in hot water, but very little in either. It has an alkaline action on vegetable colours, and absorbs carbonic acid from the atmosphere; its solution in water being rendered milky by this gas, for which, therefore, it serves as an excellent test. Its combination with sulphuric acid is known by the name of *gypsum*, or *sulphate of lime*; combined with fluoric acid, it constitutes fluate of lime, or *Derbyshire spar*. Lime is much used by tanners, skinners, &c., in the preparation of their leather; by soap-boilers, for rendering the alkaline carbonates caustic by removing their carbonic acid, and thus causing their ready combination with oils and fats; and by sugar-bakers, for refining their sugar.——*Lime-water* is used for medicinal purposes, being given internally in spasms, diarrhœa, convulsions of children, &c., and is externally applied to burns and ulcers.——LIME, the fruit of the *Citrus Limonium*, a tree of the orange order. It abounds with an acid juice.

LIME TREE or LINDEN, the *Tilia europæa* of botanists, nat. order *Tiliaceæ*. Russian mats are made from the bast or inner bark of this tree.

LIM'IT (*limito*, I bound: *Lat.*), in Mathe matics, a determinate quantity, to which a variable one continually approaches.

LIMITA'TION (*limitatio*, a fixing: *Lat.*) OF ACTIONS AT LAW, the time beyond which actions cannot be brought. When they are for the purpose of recovering land, they must be brought within twenty years. Personal actions of trespass on the case, or debt on simple contract, or for arrears of rent, must be commenced within six years after the cause of action; actions of assault, menace, imprisonment, and the like, are limited to four, and actions on the case for *verbal* slander to two. But the right of action, in the case of debt, may be revived by an express acknowledgment on the part of the debtor.

LIMO'GES ENAM'EL, a species of enamel practised at Limoges, in France, in the fifteenth century. In the time of Francis I, Leonard Limousin was the most celebrated practiser of the art; and John Landin, in the reign of Henry IV. One of the peculiarities of Limoges enamelling was the use of a transparent colour with small globules having the effect of gems.

LIM'PET, the common name of molluscs with low, conical, univalve shells, belonging to the genus *Patella*. Three species are found adhering to rocks and stones on our coasts.

LINE (*linea: Lat.*), in Geometry, a quantity having length without breadth or thickness. Lines are either *curves* or *right lines*.——LINES, in Fortification, whatever is placed on the surface of the field, as a trench, a row of gabions, &c. They are most commonly made to shut up an avenue or entrance to some place, and are distinguished into *lines of approach*, of *defence*, of *communication*, &c.——LINE, in Genealogy, a series or succession of relations, from a common progenitor.——A SHIP OF THE LINE, in Naval affairs, any vessel of war large enough to be drawn up in the line of battle; that is, having not less than two decks.——TROOPS OF THE LINE, in Military affairs, regular troops, in distinction from the militia, volunteers, &c.——MERIDIAN LINE, in Geography, an imaginary line drawn through the two poles of the earth and any part of its surface, being part of a great circle of the sphere.

LIN'EAR (*linearis*, pertaining to a line: *Lat.*), in Botany, an epithet for a leaf of the same breadth throughout, except at the extremities.——LINEAR NUMBERS, in Mathematics, such as have relation to length only: thus, a number which represents one side of a plane figure. If the plane figure be a square, the linear number is called a *root*.

LIN'EN (*linon*, lawn: *Fr.*), cloth made of flax. In common linen, the warp and woof cross each other at right angles; if figures are woven in, it is called *damask*. The species of goods which come under the denomination of linen, are table-cloths, sheeting, cambric, lawn, shirting, towels, &c. The chief countries in which linens are manufactured are Russia, Germany, Switzerland, Holland, Scotland, and Ireland. In the middle ages, linen and woollen cloth formed the only materials for dress; and fine linen was held in very high estimation. In more ancient times, linen formed the dress of the Egyptian priests, who wore it at all their religious ceremonies.

LING (*linghe: Dut.*), the *Molva vulgaris* of ichthyologists, a fish allied to the cod, which inhabits the northern seas. The ling deposits its spawn in June, and is in perfection from February to May. It is salted in great quantities, both for exportation and home consumption.

LIN'GUA FRAN'CA, the dialect spoken along the European and African coast of the Mediterranean. It is a corrupt Italian, mingled with other languages.

LIN'IMENT (*linimentum*, from *linio*, I besmear: *Lat.*), in Medicine, a semi-fluid ointment, or a saponaceous compound, used for rubbing on painful joints. Also, spirituous and other stimulating applications, employed externally.

LINNÆ'AN SYS'TEM, a scientific arrangement of all natural objects, as animals, plants, and minerals, into three kingdoms, subdivided into classes, orders, genera, and species, with a description of their generic and specific characters. It received this appellation from Charles Linné (Latinized Linnæus), the celebrated Swedish naturalist. [See a sketch of the life of LINNÆUS, in the *Biographical Treasury*.]

LIN'NET (*linot: Fr.*; from *linaria: Lat.*), the *Linota cannabina* of ornithologists, a singing bird of the finch family.

LIN'SEED (*lein*, flax: *Ger.*), the seed of the flax plant. It yields, by pressure, a large quantity of oil which when purified forms excellent lamp-oil.

LIN'SEY WOOL'SEY, cloth made of linen and wool mixed together.

LINT (*linteus*, made of linen: *Lat.*), in Surgery, linen scraped into a soft woolly substance, fit for applying to wounds, either simply, or when covered with unctuous substances. It was formerly made by hand, but it is now made by machinery.

LIN'TEL, in Architecture, a piece of timber that lies horizontally over doorposts and window-jambs.

LI'NUM (*Lat.*; from *linon: Gr.*), in Botany, a genus of plants, nat. order *Linaceæ*, containing the flax-plant. [See FLAX.]

LI'ON (*Fr.*; from *leo: Lat.*), a quadruped of the genus *Leo*, strong, fierce, and rapacious; sometimes called the king of beasts, from its combined activity, strength, and majesty of deportment. Lions are now found only in unfrequented parts of Asia and Africa. They are about eight feet from the nose to the rump, and have a tail about four feet; their colour is a pale brown, or tawny yellow, and the male has a bushy mane. The male of the species known as *Leo Goojratensis* is however without a mane. The lion of Africa is the finest and most ferocious of the genus. Their muscular strength is prodigious; their roar and fierceness terrible; but, when brought up tame, and unused to attack and defence, they allow their keepers to play with them, and are often kind to small animals placed in their dens. From the earliest times this animal has been celebrated for grateful affection, dauntless courage, and merciful forbearance; but modern naturalists deny him all these excellent qualities. The lioness brings forth from three to four cubs at a birth; and suckles them for a year, at which time their colour is a mixture of reddish and grey, with a number of brown bands. The male attains maturity in seven, and the female in six years. The strength of the lion is such, that a single blow from his paw is sufficient to destroy most animals.

LI'ONCEL (*Fr.*), in Heraldry, a small lion; the term by which lions are blazoned, when there are several in one escutcheon.

LIP'OGRAM (*leipo*, I omit; and *gramma*, a letter: *Gr.*), a writing in which some one letter is wholly omitted.

LIPPITU'DO (*Lat.*, from *lippus*, blear-eyed), in Medicine, the disease called *blear-eyes.* It consists in a puriform exudation from the margin of the eyelids, which often causes them to adhere together after sleep.

LIQUEFAC'TION (*liquefacio*, I cause to melt: *Lat.*), in Chemistry, the conversion of a solid into a liquid, by the sole agency of heat.

LIQUEUR' (*Fr.*), a name for various agreeable spirituous drinks, in which some aromatic infusion generally predominates and gives to it a name. Some are simple *liqueurs*, as *noyau*, anise-water, &c. Others have more saccharine and spirituous matter, as the *anisette, curaçoa*, &c. And a third kind are the creams, or superfine liqueurs, such as *rosoglio, maraschino*, &c.

LIQ'UID (*liquidus*, liquid: *Lat.*). Fluids have been divided into two classes: *elastic*, and *non-elastic*—or those which do not sensibly diminish in bulk when subjected to pressure. The first class are airs or gases, the second liquids: hence we may define a *liquid* to be a fluid not sensibly elastic, the parts of which yield to the least pressure, and move easily on each other.——In Grammar, a letter which has a smooth flowing sound, or which is easily pronounced after a mute; *l, m, n*, and *r*, are liquids.

LIQ'UORICE, the inspissated juice of the rhizomes or underground stems of two leguminous plants belonging to the genus *Glycyrrhiza*, cultivated in Spain, Sicily, and Calabria. It is frequently called Spanish juice, and is much used as a demulcent pectoral. A large quantity is used by brewers and tobacco manufacturers. About 1400 tons are annually imported into this country.

LIST (*lice: Fr.*), in Archæology, the enclosure within which knights held their jousts and tournaments. Hence, *to enter the lists* is to engage in any contest.

LIT'ANY (*litaneia*, from *litaneuo*, I pray: *Gr.*), a solemn form of supplication to God. Roman Catholic litanies are either addressed to a number of saints, who are successively invoked, as in the litany of the saints, or to a particular saint.

LIT'ERATES, in Ecclesiastical affairs, a name given to those who are admitted to ordination by the bishop, without having taken a university degree.

LITERA'TI (*Lat.*), in general, denotes men of learning.——In Antiquity, those who were branded with any letters by way of ignominy.

LIT'ERATURE (*literatura: Lat.*), in a general sense, comprehends all human knowledge preserved in writing. In a more usual sense, it excludes positive science; in a still more limited sense, it comprises only what is known by the term *Belles lettres* [which see]. In some cases, it has a peculiar meaning: thus, the phrase, 'literature of the middle ages,' means the aggregate of works written during the middle ages; 'medical literature,' whatever of note has been written on medicine; &c.

LITH'ARGE (*lithos*, a stone; and *arguros*, silver: *Gr.*—from being obtained in purifying silver), in Chemistry, impure protoxide of lead which has been fused.

LITH'IA (*lithos*, a stone: *Gr.*), an alkali, found in a mineral called petalite, of which the basis is a metal called *lithium*.

LITHI'ASIS (*Gr.*, from same), in Medicine, stone in the bladder or kidney.

LITH'IC A'CID (same *deriv.*), *uric* acid, the substance which constitutes the most common kind of urinary calculus.

LITH'IUM is a very sparingly distributed metal, obtainable from the fused chloride by electrolysis. It is the lightest element in nature, and floats upon every liquid; its specific gravity being only 0·59, that is about half as heavy as water. It is white and lustrous, but rapidly oxidises on contact with the air. It is so soft that it may be squeezed between the fingers. Heated to redness in the air, it takes fire and burns with a brilliant white flame. At 324° F. it melts, and volatilizes at a higher temperature.

LITH'OCARP (*lithos*, a stone; and *karpos*, fruit: *Gr.*), petrified or fossil fruit.

LITHOCHRO'MICS (*lithos*, a stone; and *chrōma*, colour: *Gr.*), the art or process of painting in oil upon stone, and of taking impressions on canvas; an ingenious invention of a French artist. It was afterwards improved upon by Senefelder, the inventor of lithography.

LITHODEN'DRON (*lithos*, a stone; and *dendron*, a tree: *Gr.*), a name for coral, which is so called from its resembling a branch.

LITHOG'RAPHY (*lithos*, a stone; and *grapho*, I write: *Gr.*). [See ENGRAVING.]

LITHOL'OGY (*lithos*, a stone; *logos*, a discourse: *Gr.*), that branch of science which treats of rocks in their mineralogical aspect. It is sometimes termed *Petrology* (*petros*, a rock: *Gr.*).

LITHONTRIP'TICS (*lithos*, a stone; and *tribo*, I wear away or consume: *Gr.*), medicines which are supposed to have the power of preventing or dissolving *calculi* in the urinary passages.

LITHOT'OMY (*lithotomia*: from *lithos*, a stone; and *temno*, I cut: *Gr.*), in Surgery, the operation of cutting into the bladder, for the purpose of removing a calculus or stone.

LITH'OTRITE (*lithos*, a stone; and *tribo*, I wear away: *Gr.*), an instrument for breaking calculi in the bladder, and reducing them to small particles, so that, being passed with the urine, *lithotomy* may be rendered unnecessary.

LITHOT'RITY (same *deriv.*), the operation by which a calculus is broken or pulverized in the bladder.

LIT'MUS, the blue dye obtained from some lichens belonging to the genus *Roccella*, which are imported from several islands in the North Atlantic. They are sometimes called *turnsole*, and afford a dye called *archil*. The feeblest acid will redden a paper tinted blue with litmus; and hence litmus paper is a very delicate test for the presence of an acid.

LI'TRE, a French measure of capacity, being a cubic décimètre—that is, a cube, each of whose sides is 3·937 inches. It contains 61·028 cubic inches, and is therefore rather less than our imperial quart, which contains 69·3185.

LIT'URGY (*leitourgia*, from *leitourgeo*, I perform public duties: *Gr.*), a name given to those set forms of prayer which have been generally used in the Christian church. The liturgy of the church of England was composed in the year 1547, since which time it has undergone several alterations, the last of which was at the restoration of Charles II.

LIV'ER (*leber: Ger.*), in Anatomy, a large viscus, of a deep red colour, situated under the diaphragm, which secretes bile, and transmits it to the duodenum and gall-bladder. In the human body, the liver is divided into two principal lobes, of which that at the right-hand side is by far the larger. The liver also secretes starch, or a starch-like substance, which becomes converted into sugar on exposure to the air.

LIV'ERSTONE, in Mineralogy, a stone or species of earth of the barytic genus, of a grey or brown colour, which, when red-hot, emits the smell of an alkaline sulphuret.

LIV'ERY (*livrer*, to deliver: *Fr.*), a suit of clothes made of different colours and with trimmings. It serves to distinguish the servants of various families of rank. At tournaments, the cavaliers wore the livery of their mistresses; and persons of rank formerly gave liveries to persons not connected with their household, to engage them in their quarrels.——LIVERY OF SEISIN, in Law, signifies delivering the possession of lands, &c., to him who has a right to them. This was formerly indispensable to the creation or transfer of a freehold estate.

LIV'ERYMAN, a freeman of the city of London, admitted member of some one of the ninety-one city companies, by which he enjoys certain privileges. The common council, sheriff, and other superior officers of the city are elected from among the liverymen; who are so called because entitled to wear the livery of their respective companies.

LIV'ERWORT, the popular name of some cryptogamic plants which grow in damp places in all parts of the world. They belong to the natural order *Hepaticæ*; they have been employed in liver complaints (hence the name), but they are now believed to be inert.

LIXIVIA'TION (from next), in Chemistry, the process of extracting alkaline salts from ashes, by pouring upon them water, which, in passing through them, dissolves out the salts.

LIXIV'IUM (a lye to wash with: *Lat.*), in Chemistry, *lye*; water impregnated with alkaline salts dissolved out from wood ashes.

LIZ'ARD (*lizarde: Fr.*). [See LACERTA.]

LLA'MA, in Zoology, a genus of South American mammals belonging to the family of camels. There are two wild species, and two species or varieties in a state of domestication. Of the former, the *Guanaco* (*L. guanacus*), inhabits the plains in the temperate part of South America; whilst the *Vicuña* (*L. vicugna*) frequents the Andes. The former is an elegant animal, with a long slender neck and fine legs, living in small herds of from six to thirty in a herd. It is wild and wary, but falls a prey in large numbers to the Indians and the puma. Of the domesticated forms, the *llama* has whitish hair and long legs, whilst the *alpaca* has blackish hair and short legs The fine silky hair of the latter has been largely imported of late years and manufactured into a textile fabric. Living animals have been conveyed to Australia, where it is proposed to breed them.

LLOYDS', an association of underwriters (or insurers of ships), shipowners, and merchants, who are established at the Royal Exchange, London. They have agents all over the world, who forward to head quarters the earliest news of the departure, the arrival, the loss or damage of vessels. There are about 1900 subscribers who pay an entrance fee of 25 guineas, and an annual subscription of 4 guineas. If underwriters or insurance brokers, the subscription is 10 guineas. The management is vested in a committee of nine members. The name originated in the fact of a man, called Lloyd, keeping a coffee-house, at which persons connected with shipping were in the habit of meeting. 'Lloyd's Register of British and Foreign Shipping' is a distinct association, the object of which is to ascertain the character and condition of ships by the examination of competent persons.

LOAD, a name given by traders to quantities of various articles: thus, a load of unhewn timber consists of 40 cubic feet; a load of squared timber 50 cubic feet; a load of inch boards 600 square feet; a load of bricks 500; a load of lime 32 bushels; a load of sand 36 bushels.

LOAD'STONE (*lædan*, to lead: *Sax.* It is more correctly spelled *lodestone*), magnetic iron ore. It is usually in the state of an oxide.

LO'AMY SOIL (*laam*, loam: *Sax.*), a soil in which alumina, called *clay* by the agriculturist, prevails. It is heavy or light, as the alumina is in larger or smaller quantity. Generally speaking, loamy soils are more productive than sand or chalk, but in every case much depends on the subsoil.

LOAN (*hlan: Sax.*), a sum of money lent to another, generally on the security of a promissory note or bond, the guarantee of a third party; or the possession or assignment of property by *bill of sale*. Sometimes it is effected by governments on the pledge of certain taxes set apart to pay the interest; this is called a *public loan*. The practice of borrowing money to defray the extraordinary expenses in time of war, which has been adopted in Great Britian for some time past, has given rise to the *national debt* [which see]. Where there is a well-founded system of credit, statesmen think it most advantageous to guarantee the regular payment of the stipulated interest, and leave the payment of the capital at the pleasure of the state; which is called the *funding system*.

LOBE (*lobus: Lat.*), in Anatomy, any fleshy protuberant part, as the lobes of the lungs, lobes of the ears, &c.——*Lobed* or *lobate*, divided into parts distant from each other, with convex margins.

LOB'STER (*Sax.*), a well-known crustacean, the *Homarus vulgaris* of naturalists. When fresh from the water, the shell is of a blue colour, but it turns red on being boiled. It is said that the lobster is in the habit of casting its claws, when alarmed by a violent thunderstorm or the firing of cannon. On being seized by one of its legs, it will throw it off and make its escape, leaving the limb behind Immense quantities, probably 800,000 lobsters, are annually brought into the London market, and as many as 25,000 have arrived in one day; the major part are taken on the coast of Norway. Two other crustaceans are called Lobster; these are the Spiny Lobster, (*Palinurus vulgaris*), and the Norway Lobster (*Nephrops norvegicus*), but neither is so much esteemed as the common lobster.

LO'CAL (*localis: Lat.*), pertaining to a fixed or limited portion of space.——LOCAL ACTIONS, in Law, such as must be brought in the particular county where the cause arises.——LOCAL COLOURS, in Painting, such as are natural and proper for each object in a picture.——LOCAL MEDICINES, those destined to act upon particular parts. ——LOCAL MILITIA, a temporary armed force, embodied for the defence of the country, and required to serve only within certain limits.—LOCAL PROBLEM, in Mathematics, that which admits of innumerable solutions.

LOCK (*loc: Sax.*), a piece of mechanism, requiring much art and nicety in contriving and varying its springs, bolts, and different parts, according to the uses for which it is intended. **Locks** are of various forms, but the principle on which they are all constructed is the application of a lever (the key) to an interior bolt, by means of a communication from without; and the security of locks depends upon the impediments (*wards*) which may be interposed betwixt this lever and the bolt, and the impediments to the movement of the bolt (*tumblers, &c.*), which are to be thrown out of action by the key. Locks are known to be of great antiquity, because sculptures of what are similar to those now used in Egypt have been discovered on the great temple of Karnac, whence Denon infers they were known in Egypt about four thousand years since. Abundance of ancient keys, some of them esembling many used in the present day, may be seen at the British Museum.——LOCK, the barrier or works of a canal, which confine the water where the change of level takes place; it is furnished with gates at each end, which separate the higher from the lower level. When a boat passes up the canal, the lower gates are opened, and the boat passes into the lock, after which the gates are shut. A sluice, communicating with the upper part of the canal, is then opened, and the lock rapidly fills with water, elevating the boat on its surface. As soon as the lock is filled to the highest water-level, the upper gates are opened, and the boat, being now on the level of the upper part of the canal, passes on its way. The reverse of this process is performed when the boat is descending the canal. The amount of elevation and descent made by the locks of a canal is termed the *lockage*.

LOCOMO'TION (*loci motio*, change of place: *Lat.*), the art or power of moving from place to place. The chief obstacles which oppose locomotion, or change of place, are gravity and friction, and the various kinds of mechanism which are intended to assist locomotion are contrivances for obviating the effects of these. No piece of inert mechanism is so favourably adapted as the wheel carriage, for moving weights over the common ground, with its ordinary asperities and inequalities of substance and structure.

LOCOMO'TIVE (same *deriv.*), or LOCOMO'TIVE EN'GINE, a steam-engine, which moves itself, at the will of the person in charge of it; being either attached to a wagon or carriage inseparably, or capable of connection with the carriage or train of carriages intended to be drawn by it. The former is the arrangement when the machine is designed for ordinary roads; the latter when for railways. The first locomotive was used in 1804, at Merthyr-Tydvil, and was in many respects like those employed at present. Engineers, in the infancy of steam locomotion, were firmly impressed with the idea that an engine could not be made to progress, by mere friction, between the wheels and the rails; they believed that, in all cases, the wheels would revolve without causing progressive motion, as in practice they are found to do when the rails have been rendered extremely slippery by frost or rain. Hence they invented many most ingenious but unnecessary contrivances to overcome a difficulty which existed only in their own imaginations. Locomotive engines consist essentially of a boiler, cylinders, excentrics, cranks, &c. The *boiler* is a cylinder about 12 feet long, placed on its side, having a *fire-box* at one end and a *smoke-box* at the other, the smoke-box leading into the chimney. The fire and smoke boxes are connected by means of about 300 brass tubes, of 2¼ inches external diameter. The smoke and heated air pass through these, and communicate a vast quantity of caloric to the water in which they are immersed; and the *heating surface*, which is increased also by the fire-box being surrounded with water, may amount altogether to about 2000 square feet, 150 of which are due to the fire-box. A *steam* dome, placed on the upper part of the boiler, affords a space in which the steam deposits the particles of water with which it becomes mechanically mixed by the violent ebullition; and thus the introduction of water along with the steam into the cylinders, technically termed *priming*, is prevented. Priming is highly mischievous, and sometimes causes the bottom to be knocked out of a cylinder, or the piston-rod to be bent. As a fly-wheel to regulate the motion, or carry a crank over the *dead points*, is inadmissible, two cylinders at least are required, and that number is rarely exceeded. Their pistons sometimes act on the driving wheels, and sometimes on the axle belonging to the latter. The driving wheels are about eight feet in diameter. That each piston may be capable either of a direct or reverse action on its crank—that is, that the train may be moved with equal facility in either direction—there is a pair of excentrics for each cylinder, each pair being so connected with its own slide valve, by means of what is called the *link motion*, that either excentric can be made instantaneously to act on the valve, by means of a handle, the other excentric being by the same movement thrown out of action; and the same handle regulates the link motions of both the cylinders simultaneously, so that both engines (for a locomotive really consists of two engines) are sent forward or reverse by the same act of the driver. The steam is turned on or off by the *regulator*, which consists of two circular plates fixed in the end of a pipe which is within the boiler and which forms a communication between the steam space of the boiler and the cylinders, these plates have apertures which, when they are brought into correspondence—by turning a handle—allow the steam to pass from the boiler to the cylinders, but when the solid parts of one close the apertures in the other, the steam is intercepted. The boiler is supplied with water by two *force-pumps*, worked in the usual way, or by *injectors*, a self regulating contrivance now very commonly used. The *waste* steam is turned into the chimney, where, by the rarefaction it causes, it increases the draught, and just in proportion as it is required to be effective. The whole is placed on six wheels, and a tender with fuel and water is either attached to or drawn after it. This fuel is, in these countries, coke, or a mixture of coke and coal; in some parts of Europe, and most parts of America, it is wood, which, not giving so hot a fire, does not allow such speed. A constant supply of oil is conveyed to all parts of the machinery, for the purpose of lubrication, by very simple contrivances. When the locomotive is intended to move a heavy load, engineers do not depend on the friction between only the *driving* wheels and the rails, but unite these wheels with others by means of bars. A powerful engine with its water will weigh about 36 tons; it will evaporate about 350 cubic feet of that fluid in an hour, and will convey a load of about 230 tons at a speed of 40 miles an hour. Attempts have been made to introduce locomotives on ordinary roads. But, from the complication, unavoidable delicacy, and therefore costliness of the machinery—on account of the injury done to it by the shaking and concussions—and from the serious obstacles presented by ruts and slight acclivities, it has not yet been found possible to work them to any extent with punctuality and economy. They are found, however, to answer well, in certain cases, for drawing heavy loads.

LOC'ULAMENT (*loculamentum*, a receptacle: *Lat.*), in Botany, the cell of a pericarp in which the seed is lodged. Thus we say of a pericarp, it is *unilocular*, *bilocular*, &c.

LO'CUM TE'NENS (holding a place: *Lat.*), a deputy or substitute; one who supplies the place of another, or executes his office.

LO'CUS (a place: *Lat.*), in Geometrical Analysis, the line traced by a point, which varies its position according to some determinate law. When the *locus* was a straight line or a circle, the ancient geometers termed it *plane*; but, when it was one of the conic sections, *solid*. The moderns distinguish *loci* into orders, according to the dimensions of the algebraic equations by which they are represented.——LOCUS IN QUO, in Law, the place where anything is alleged to be done, in pleadings, &c.——LOCUS PARTITUS, a division made between two towns or counties, to determine where any land or place in question lies.

LO'CUST (*locusta*: *Lat.*), a voracious insect, somewhat resembling the common grasshopper. The common European species is the *Locusta migratoria* of entomologists, placed by them in a family of orthopterous insects, belonging to the section *Saltatoria* (*salto*, I leap: *Lat.*), or those furnished with hind legs formed for leaping. Locusts are at times so numerous in Africa and the south of Asia, that they do immense injury to vegetation, literally devouring every thing green; and when they migrate they fly in clouds, darkening the air by their numbers. Happily for mankind, this calamity is not frequently repeated, for it is the inevitable precursor of famine and its horrible accompaniments. Even when dead, they are still productive of evil consequences; since the putrefaction which arises from their inconceivable number is so great, that it is justly regarded as one of those desolating pestilences which almost depopulate whole districts of country. Sometimes, though not often, they appear in Europe, and produce the same effects. In the year 591, an army of unusually large locusts ravaged Italy; and being at last cast into the sea (as seems for the most part to be their fate), a pestilence, it is alleged, arose from their stench, which carried off vast multitudes of men and beasts. In the Venetian territory, likewise, in 1478, more than 30,000 persons are said to have perished in a famine chiefly occasioned by the depredations of locusts. In Barrow's Travels it is stated, that in Southern Africa the whole surface of the ground might literally be said to be covered with them for an area of 2000 square miles. The water of a very wide river was scarcely visible on account of their dead bodies that floated on the surface. The larvæ are much more voracious than the perfect insects; and when they are on a march during the day, it is utterly impossible to alter the direction in which they move, which is generally with the wind. Much controversy has arisen regarding the 'locusts and wild honey,' which were the food of John the Baptist in the wilderness. But wild honey is found in the clefts of the rocks of Judæa as abundantly as in the caves of Hindustan. And if we refer to the book of Leviticus (xi. 22), we shall find that locusts constituted a common food among the Jews; the different kinds which they were permitted to eat being there specified.

LO'CUST-TREE, the *Hymenæa Courbaril* of Linnæus. It belongs to the *Leguminosæ*, and is distinguished no less for its valuable wood than for the beauty of its foliage and its fragrant white flowers. The leaves are pinnate, and the leaflets very thin and smooth. The wood is compact, hard, capable of receiving a fine polish, and has the property of resisting decay longer than almost any other. It grows very rapidly in the south-western states of America, sometimes reaching to the height of eighty feet.

LODE (*lædan*, to lead: *Sax.*), among miners, a metallic vein; or any regular vein or course, whether metallic or not. Those lodes which contain the ores of metals are said by the miners to be *alive*, but those which contain only stony matters are called *dead lodes*.

LODGED (*loger*, to dwell: *Fr.*), in Heraldry, a term for a buck, hart, &c., when lying on the ground; answering to *couchant*, which is applied to a lion or other beast of prey.

LODG'MENT (*logement*: *Fr.*), in Military affairs, a work raised with earth, gabions, fascines, &c., to cover the besiegers from the enemy's fire, and to prevent their losing a place which they have gained, and are resolved, if possible, to keep.

LOG (*lock*: *Ger.*), in Navigation, usually a piece of board, forming usually the quadrant of a circle of five or six inches radius; it is about a quarter of an inch thick, and so balanced with lead nailed to the circular part, that it floats perpendicularly, with about two-thirds immersed. The *log-line* is a thin cord, one end of which is fastened to the log, and the other is wound round a reel in the gallery of the ship. The log thus poised keeps its place in the water, while the cord is unwound from the reel by the motion of the vessel. The velocity of the latter is known by the number of knots on the line run out while the glass is running down [see KNOT]. There are other kinds of log, but their principle and mode of use are similar.——LOG-BOARD, two boards shutting like a book, and divided into columns, for the hours of the day and night, the direction of the wind, the course of the ship, &c., in which an account of the ship's way is marked.——LOG-BOOK, the book into which the contents of the log-board are transcribed.——LOG-REEL, a reel in the gallery of a ship, on which the log-line is wound.

LOGARITH'MIC, or LOGIS'TIC, an epithet for a peculiar curve. It is so called from its utility in explaining and constructing logarithms, on account of its ordinates being in geometrical progression.

LOG'ARITHMS (*logos*, proportion; and *arithmos*, number: *Gr.*), the *exponents* of a series of powers and roots. When the logarithms form a series of numbers in arithmetical progression, the corresponding natural numbers form a series in geometrical progression. Thus,

Arithmetical: 0, 1, 2, 3, 4, 5, 6, &c.
Geometrical: 0, 2, 4, 8, 16, 32, 64, &c.

The terms of the arithmetical progression show what powers of the root (in this case 2) will be equal to the corresponding terms in the geometrical. Thus 4 is the *second* power of 2; 32 the *fifth* power, &c. The upper line, therefore, contains the logarithms of the lower; and logarithmic tables furnish the decimals corresponding to the intermediate numbers in the lower line. A table of logarithms of all numbers, to a certain limit, made according to an assumed root, or *base*, is called a *logarithmic system*. The most common is that of Briggs, in which the base is 10; hence 1 is the logarithm of 10, 2 of 100, 3 of 1000, 4 of 10,000, &c.; and the logarithms of the intermediate numbers are of intermediate values. The use of logarithms in trigonometry was discovered by John Napier, a Scottish baron, and made known by him in a work published at Edinburgh in 1614. Logarithmic tables are of great value, not only in trigonometry, astronomy, &c., but to all who have to make calculations with large numbers. For, to multiply numbers, we add their logarithms; to divide them, we subtract their logarithms; to raise them to powers, we multiply their logarithms by the exponents of the powers; and to extract any roots, we divide their logarithms by the exponents of the roots. [See EXPONENT.] Logarithms belonging to any one system—that is, belonging to a system having any given base—may be changed into those of any other system by means of a constant factor.

LO'GIC (*logikos*, belonging to the reason: *Gr.*) has been variously defined. Whately says it is the science as well as the art of reasoning. John Mill defines it as the science of the operations of the understanding, which are subservient to the estimation of evidence; that it is both the process itself of proceeding from known truths to unknown, and all intellectual operations auxiliary to this. Other writers restrict logic within much narrower limits, and define it as the science of the necessary laws of thinking. In this last sense reasoning is confined to what is termed ratiocination, a form of inference of which the syllogism is the general type. So understood, logic owes its first exposition to the master mind of Aristotle. All syllogistic reasoning supposes two propositions, called *premises*—both expressed, or one expressed and the other understood—from which the conclusion to be arrived at is deduced. In many cases, it is evident that, if the premises be true, the conclusion drawn from them must be true also; but in many others, the premises may be true, and yet the conclusion be false. In the former there is, but in the latter there is not, a necessary connection between the premises and the conclusion. 'Every man is an animal; John is a man; therefore John is an animal,' is correct reasoning. 'Every man is an animal; an angel is not a man; therefore an angel is not an animal,' is incorrect reasoning: the conclusion may be true, but it does not follow from the premises. This will be more evident from another example:—'Every man is an animal; a horse is not a man; therefore a horse is not an animal.' Here the conclusion is false, though it follows just as much from the premises as the former. Every proposition either affirms or denies something; hence propositions are either *affirmative* or *negative*. Every proposition either affirms or denies something regarding an entire class, or regarding some member or members of it; hence propositions are either *universal* or *particular*. [See ENTHYMEME, SYLLOGISM, &c.]

LOGOG'RAPHY (*logos*, a word; and *grapho*, I write: *Gr.*), a mode of printing in which the types form whole words instead of letters. By this method, the process of composing would seem to proceed with more expedition and less liability to err. It has been used to a certain extent, but the plan never came into general use, and it has long since been abandoned altogether, from an idea that more time was lost than gained by it.——Also a system of reporting, adopted during the French revolution, and intended to supersede short-hand writing; but it was not found to answer so well. Twelve or fourteen reporters being seated round a table, the first took down the first three or four words, and touched his neighbour, who took down the next three or four words, and touched his neighbour, who did the same; and thus the process continued to go round until the speech was ended. When the slips were filled, and placed parallel to each other, they formed a page.

LOG'OGRIPH (*logos*, a word; and *griphos*, a fishing-net: *Gr.*), a kind of riddle, which consists in some elision or mutilation of words; being of a nature between an enigma and a rebus.

LOG'WOOD, an important article of commerce, much used in the arts, is derived from a low, crooked, prickly tree, found in great plenty at Campeachy, in the bay of Honduras, and denominated *Hæmatoxylon Campechianum*, nat. order *Leguminosæ*. It is very dense and firm in its texture, exceedingly heavy, so as to sink in water, of a deep red colour, and capable of receiving a fine polish. It yields its colour both to spirituous and watery menstrua, but more readily to the former. Acids render its decoction brighter and paler; alkalis give it a purplish or violet colour; the salts of iron make it a dark violet blue; gelatine forms with it a reddish precipitate. In 1857, 39,568 tons were imported, the value of which was 236,080*l.*

LOINS (*longe*: *Fr.*), in Anatomy, the two lateral portions of the umbilical region of the abdomen; or the space on each side of the vertebræ, between the lowest of the false ribs and the upper part of the haunch-bone: called also the *reins*.

LOL'LARDS (*lallen*, to sing in a low murmuring tone; and the common affix *hard*; *Ger.*), a sect of early Reformers in Germany and England, the followers of Wickliffe. The name was originally given to a class of persons in Germany and the Netherlands, who, in the 14th century, undertook spiritual offices in behalf of the sick and the dead, and were greatly beloved by the people, who had become alienated from the secular and regular clergy, on account of their indifference and neglect.

LOM'BARDS, a name formerly given to bankers, because the people of Lombardy first followed this branch of commerce. Hence the name of *Lombard Street*, so long noted for its numerous banking houses.

LOMENTA'CEÆ, in Botany, a division of the cruciferous order, formed of plants having seed-vessels, which divide transversely into single seeded cells.

LOMENT'UM (bean meal: *Lat.*), in Botany, a legume which does not open at the sutures, but divides transversely into one-seeded portions, as in the genera *Ornithopus* and *Coronilla*.

LON'DON CLAY, a member of the Lower Eocene formation, consisting of a very tenacious clay, usually of a blueish-grey colour. In the valley of the Thames it has a maximum thickness of about 480 feet. It is supposed to have slowly accumulated at the bottom of a deep ocean, but in the neighbourhood of land. The fossils bespeak a warm climate. They consist of the bones of elephants, reptiles, and fish, about 150 species of shells, and many fruits and seeds. A large part of London, both north and south of the river, is built upon this clay. It composes the greater part of Highgate Hill, and Shooters Hill.

LONGEV'ITY (*longævus*, aged: *Lat.*), length or duration of life; generally designating great length of life. Confining ourselves to modern times, the evidence in support of statements as to extraordinary length of life is scanty. Henry Jenkins is said to have lived to the age of 169 years, the Countess of Desmond to 148, and Thomas Parr to 152. Dr. Van Oven has given seventeen instances of lives alleged to exceed 150 years. Physiologists have often speculated upon the possibility of extending the span of human existence much beyond the present average, and it has been confidently asserted that one hundred years is the natural extent of the life of man. Presuming a healthy constitution to begin with, and the non-occurrence of injurious accidents, four general conditions are required to the attainment of long life, viz. good air, to oxygenate the blood; a sufficient amount of aliment to supply waste, but not more than is needed; and a proper amount of exercise for body and mind.

LONGIM'ETRY (*longus*, long: *Lat.*; and *metron*, a measure: *Gr.*), the art of measuring lengths or distances, both accessible and inaccessible.

LON'GITUDE (*longitudo*, length: *Lat.*), in Geography, the distance in degrees of any place from a first meridian, as that of Greenwich, taken east or west. These degrees diminish in actual length as the pole is approached, a degree of longitude at the equator being 69·1 miles; at latitude 10° but 68·1; at 20° but 65·0; at 40° but 53·05; at 50° but 44·54; and at 60° but 34·66, &c. The British parliament, in 1714, offered a reward of 20,000*l.* for an accurate method of finding the longitude at sea, within one-half of a degree; but this act was repealed in 1828. Chronometers are now made with extraordinary accuracy, and have sometimes been used for the determination of longitude upon land, as well as at sea, with great success; but, nevertheless, astronomical observations furnish the most exact methods of obtaining it.——LONGITUDE, in Astronomy, an arc of the ecliptic intercepted between the beginning of Aries and the point of the ecliptic cut by the circle of longitude belonging to any star. The longitude of a star is found by means of its right ascension and declination.

LONG-PRIM'ER, the name of a printing type, somewhat larger than is generally used for a newspaper, being between bourgeois and small-pica.

LONICE'RA, in Botany, a genus of plants, nat. ord. *Caprifoliaceæ*, including some of the species of honeysuckle. The wild English species of honeysuckle, however, belong to the genus *Caprifolium*. The *Lonicera grata*, or evergreen honeysuckle, is the most beautiful of that genus: it grows without any culture in North America; and has strong branches, covered with a purple bark, which are ornamented with bright green leaves embracing the stalks, and continuing their verdure all the year. The flowers are powerfully aromatic; they first appear in June, and then, in a constant succession, till the frost commences.

LOOK'ING-GLASS. [See MIRROR.]

LOOM, a frame of wood or metal, by which the process of weaving is performed.——The words *loom* (*leoman*, to loom, or appear at sea: *Sax.*) and *looming* are also used to express what we understand by the term *mirage*. Thus, when a ship, seen at a distance, appears larger than it really is, and indistinct, it is said she *looms*; of a mountain, under similar circumstances, it is said *the land looms high*.

LOOM'-GALE, a gentle gale, in which a ship can carry her topsails atrip.

LOOP'HOLES, in Fortification, small holes in the walls of a castle, &c., through which arrows were discharged.——In a ship, small apertures in the bulkhead, and other parts of a merchant ship, through which small arms are fired at an enemy.

LORD (*hlaford*, a ruler: from *hlaf*, a loaf; and *ford*, to give: *Sax.*), a title of courtesy given to all British and Irish noblemen, from the *baron* upwards; to the eldest sons of earls; to all the sons of marquises and dukes (see COURTESY TITLES); and, as an honorary title, to certain official characters; as the *lord* mayor of London, the *lord* chamberlain of the king's household, the *lord* chancellor, the *lord* chief justice, &c. *Lord* is also a general term, equivalent to *peer*.——LORD, in Law, one who possesses a *fee* or *manor*. This is the primitive meaning of the word; and it was in right of their fiefs that, originally, *lords* sat in parliament.——In Scripture, a name for the Supreme Being. When LORD, in the Old Testament, is printed in capitals, it is the translation of the Hebrew word for JEHOVAH. It is also applied to Christ, to the Holy Spirit, to kings, and to prophets.

LORDS, HOUSE OF, is composed of the peers of England, of Great Britain, and of the United Kingdom; of the 16 representative peers (but not the other peers) of Scotland; of the 28 representative peers (but not the other peers) of Ireland; and of the lords spiritual, who consist of 2 English archbishops and 24 bishops, and 4 representative Irish bishops. Lord Redesdale, writing of the peerage, describes that body first, as possessing individually titles of honour giving them respectively rank and precedence; secondly, as being individually hereditary counsellors of the crown; thirdly, as being collectively (together with the spiritual lords) when not assembled in parliament, the permanent council of the crown; fourthly, as being also collectively (together with the spiritual lords), when assembled in parliament, a court of judicature [see APPEAL]; and fifthly, as having for a long time formed, with the Commons, when convened in parliament, the Legislative Assembly of the kingdom, by whose advice, consent, and authority, with the sanction of the Crown, all laws have been made. Three lords of parliament, whether spiritual or temporal, are sufficient to constitute the house. The Lord Chancellor is *ex officio* speaker of the house, and takes his seat on the woolsack when the house is sitting. A peer cannot take his seat until he is 21 years old, nor until he has taken certain oaths. In voting the peers say 'Content' or 'Not content.' The House of Lords is the tribunal for trying criminal charges against peers, and the Lords then say 'Guilty' or 'Not Guilty, on my honour.'

LORI'CA (a coat of mail: *Lat.*), in Roman Antiquity, a cuirass, brigandine, or coat of mail, which was made of leather, and set with plates of various forms, or rings like a chain.

LORICA'TION (same *deriv.*), the covering a glass or earthen vessel with a coat or crust of a matter capable of resisting the action of a strong fire and sustaining a high degree of heat.

LOR'IMER (*lorimer*: *Fr.*; from *lorum*, a thong: *Lat.*), in Archæology, a name given formerly to those who made spurs, bits, and other articles of iron for horses.

LO'RY, the popular name of birds forming the sub-family, *Loridæ*, of the parrot family. Red predominates in their plumage. Lories are docile and familiar; they very easily learn to speak, and are remarkable for their attachment to their owners.

LO'TION (*lotio*, a washing: *Lat.*), in Medicine and Pharmacy, a liquid intended for application to any external part of the body.

LOT'TERY (*loos*, a lot: *Ger.*), a scheme for the distribution of prizes by chance; or the distribution itself. The drawing of the first public lottery in England was on Jan. 11th, 1569; and, according to Stow, it continued till the 6th of May following. This took place at the west door of St. Paul's Cathedral, and the prizes consisted of a large quantity of royal plate and trinkets, the produce of which, it was stated, would be used 'for the reparation of the havens and strengths of the realm, and such other public good works;' but the proceeds, it is believed, were notwithstanding applied to private purposes. Licenses for various kinds of lotteries were granted occasionally from that period, till at length 'state lotteries' became a source of revenue to the government; and by means of them, money was raised for the British Museum, Westminster bridge, &c. But the temptations thus thrown in the way of all descriptions of persons produced evidently demoralizing effects, and many reasons were urged in parliament for their discontinuance; till at last the evils resulting from this species of gambling became so palpable, that government consented to its abolition in 1826. From the very nature of a lottery, since those who establish it propose to make more or less by it, the prizes could not be equivalent to the cost of all the tickets. A person would, therefore, certainly lose who should buy them all; and the more he should buy, the greater would be his chance of loss. In every case, the risk must exceed the chance of success.

LO'TUS (*Lat.; from lotos: Gr.*), a shrub, the fruit of which is a small farinaceous berry, of a delicious taste, which the natives of Africa make into a sweet cake.——The ancients gave the name to an herb and a tree, each differing from the plant to which we apply it. The herb is a species of *Nelumbium;* the tree lotus is supposed to be the *Rhamnus Lotus*. The former, which we are informed by Herodotus was a lily, abounding in the Nile, was that which was venerated by the Egyptians. It was also a sacred plant in India, where, from the mode of its vegetation, it was adopted as an emblem of fertility. The fruit is conjectured to be the bean which Pythagoras forbad his followers to eat. However, it is collected by the poor Egyptians, with whom it is an article of food. It was an ancient superstition that if a stranger ate this fruit he straightway forgot his own country.

LOUIS-D'OR, a French gold coin, which received its name from Louis XIII., who first coined it in 1641. The value of the old *louis-d'or* was 24 francs; that of the new *louis*, usually called a *Napoleon*, is 20 francs.

LOU'IS, ST., KNIGHTS OF, the name of a military order in France instituted by Louis XIV. in 1693.

LOUSE, the name of certain parasitic insects belonging to the order ANOPLURA. They infest man and other animals. The species of the genus *Pediculus* have six legs, two eyes, and a suctorial mouth.

LOUVRE, a palace at Paris measuring 576 feet by 538 feet, enclosing a court 394 feet square. The oldest part was erected in the time of Francis I., but the greatest portion of the existing edifice was built in the reign of Louis XIV., Perrault being the architect. It has been lately connected with the Tuileries, and the combined buildings form the most splendid pile in Paris. In the Louvre are collections of paintings, and museums of Egyptian, Greek, and Latin antiquities.

LOV'E-APPLE, or TOMATO, the fruit of the *Solanum lycopersicum*. It is so much esteemed by the Portuguese and Spaniards, that it is an ingredient in almost all their soups and sauces, and is deemed cooling and nutritive.

LOW'ER EM'PIRE, the Roman and Eastern empires, after the removal of the latter to Constantinople; and the Eastern until its fall.

LOX'IA, in Ornithology, a genus of conirostral passerine birds. The *Loxia curvirostra*, or common cross-bill, is about the size of a lark. Its favourite food consists of the seeds of the pine; and pine woods are always its principal haunts. It has the habits of a parrot; and in North America it builds on the highest firs, attaching its nest to the trunk by means of the exuded resin.

LOXODROM'IC CURVE (*loxos*, oblique; *dromos*, a course: *Gr*). [See RHUMB.]

LOZ'ENGE (*losange: Fr*), in Geometry, a quadrilateral figure, having two opposite angles acute, and two opposite obtuse.——In Heraldry, the escutcheon which is used to contain the coats of arms of all maidens and widows.——In Pharmacy, a medicine made to be kept in the mouth, and which was originally in the form of a lozenge.

LUB'BER'S HOLE (*lummel*, a lubber: *Ger.*), in a ship, the vacant space between the head of a lower mast and the edge of the top. It is so termed from a supposition that a *lubber* (a contemptuous name for one who does not know a seaman's duty) will not like to trust himself up the futtock shrouds, but will prefer that way of getting into the top.

LU'BRICATE (*lubrico*, I make slippery: *Lat.*), a word often used in Medicine, signifying to make smooth or slippery. Thus, mucilaginous and saponaceous preparations are said to *lubricate* the parts to which they are applied. It is also employed in engineering, to express the supplying of oil to machinery for the diminution of friction.

LU'CERN (*lucerne: Ger.*), the *Medicago sativa*, a well-known leguminous plant, affording one of the artificial 'grasses' of the farmer. It was highly esteemed by the ancients; and is found by the moderns most effective in nourishing and fattening cattle.

LU'CIFER (*lux*, light; and *fero*, I bring: *Lat.*), the morning star; called when an evening star, *Hesperus*. These names are now used only in poetry.

LU'CIFER MAT'CHES. The matches used for the purpose of ignition by means of a flint and steel consisted of very small pieces of wood, the ends of which were coated with sulphur. As early as 1673, a bit of sulphur wrapped in paper, and ignited by friction, was sometimes used to set fire to the sulphur match. But the earliest form of our present *lucifers* consisted in matches tipped with a composition consisting of chlorate of potash, sugar, gum, and a little vermilion. When these were dipped into a small bottle containing sulphuric acid, they instantaneously ignited. The first lucifer matches, properly so called, were tipped with a mixture containing chlorate of potash, sulphuret of antimony, and starch; and were ignited by being drawn across sand-paper. Phosphorus was then substituted for sulphuret of antimony, and nitre for chlorate of potash; which produced quiet ignition instead of detonation; and either no sulphur, or very little, was employed. The wood was split into very fine pieces by machinery; and wax taper, touch-paper, &c., were substituted in some instances for wood. The manufacture is, at present, carried on in England and Germany on a very large scale. The use of phosphorus is very injurious to the workmen, as it causes a most horrible disease of the jaws, which ends in total loss of the bone. This would be entirely prevented by employing *amorphous* phosphorus, which answers admirably for the purpose.

LUCIFE'RIANS, in Ecclesiastical History, the followers of Lucifer, bishop of Cagliari, in the 4th century; a sect which maintained the carnal nature of the soul, and that there is no place for repentance for such as fall.

LUCIM'ETER (*lux*, light: *Lat.;* and *metron*, a measure: *Gr.*), an apparatus for measuring the intensity of light proceeding from different bodies.

LUCUL'LITE, in Mineralogy, a black limestone, often polished for ornamental purposes, and said to have been first used by Lucullus, the Roman consul.

LU'DI (*Lat.*), in Antiquity, public exhibitions among the Greeks and Romans for the display of skill and the entertainment of the people. [See GAMES.]

LUFF (*luft*, the wind: *Sax.*), the foremost edge, or leach, of a fore and aft sail.——*Keep your Luff!* in Navigation, an order to the helmsman to put the tiller on the lee-side, for the purpose of making the ship sail nearer to the wind. A ship is said to *spring her luff*, when she yields to the helm by sailing nearer to the wind.——*Luff round!* the order to throw the ship's head up in the wind.——LUFF-TACKLE, a large tackle not destined for any particular place in the ship, but moveable at pleasure.

LUG'GER, a vessel carrying three masts, with a running bowsprit, upon which she sets lug-sails, and sometimes has topsails adapted to them.——LUG-SAIL, a square sail bent upon a yard that hangs obliquely to the mast at about one fourth of its length.

LUKE, ST., GOSPEL OF, a canonical book of the New Testament, distinguished for fulness, accuracy, and traces of extensive information. Some think it was properly St. Paul's, and that when the apostle speaks of his gospel, he means what is called St. Luke's. Irenæus says that St. Luke digested into writing what St. Paul preached to the gentiles; and Gregory Nazianzen tells us that St. Luke wrote with the assistance of St. Paul.

LUMBA'GO (*Lat.;* from *lumbus*, the loin: *Lat.*), in Medicine, a rheumatic affection of the muscles about the loins.

LUM'BAR RE'GION (same *deriv.*), in Anatomy, the posterior portion of the body, between the false ribs and the upper edge of the haunch-bone.

LUM'BRICAL MUS'CLES (from next), in Anatomy, certain muscles of the fingers and toes, so named from their resembling a worm.

LUM'BRICUS (*lumbricus*, an intestinal worm: *Lat.*), a genus of worms, of which the earth-worm is the type. This is sometimes nearly a foot in length, and is composed of upwards of 120 rings. The species is very abundant, and their castings constitute a rich soil.

LUMP'-FISH, or LUMP SUCKER, the *Cyclopterus Lumpus*, a thick fish having the back sharp and elevated; the belly flat, and of a crimson colour; and along the body five rows of sharp bony tubercles. The lump-fish swims edgewise, and is enabled to adhere with great force to any substance to which it attaches itself. It is frequently taken on the British coasts.

LU'NACY (*luna*, the moon: *Lat.*), the condition of an insane person who has lucid intervals; it was formerly supposed to depend on phases of the moon.——In Law, it includes all who are affected with any species of insanity supervening since birth; those born without reason being *idiots*. The sovereign is supposed to have the custody of idiots and lunatics, which he delegates to the keeper of the great seal, to whom applications for commissions of lunacy are directed. Lunatics are maintained by an allowance out of their own estate; or when they have none, in public asylums. If a criminal is acquitted of a crime, on account of his being insane at the time of its commission, he is committed to public custody.

LU'NAR CAUS'TIC, in Chemistry, *nitrate of silver* fused at a low heat.

LU'NAR DIS'TANCE, in Astronomy, the angular distance between the apparent centres of the moon and certain heavenly bodies, such as they would appear to an observer at the centre of the earth.

LU'NAR MONTH, the time required by the moon to complete a revolution about the earth, and return to the same position relatively to some celestial body, or point in space, with which her motion is compared. The proper lunar month is the same as the *lunation*, or synodic month, and is the time which elapses between two consecutive new or full moons. The *periodic* or *synodic* month is the revolution with respect to the moveable equinox, and consists of 29 days, 12 hours, 44 minutes, 2·84 seconds. The *anomalistic* month is the time in which the moon returns to the same point of her moveable elliptic orbit: its length is 27 days, 13 hours, 18 minutes, 37·4 seconds. The *sidereal* month is the interval between two successive conjunctions with the same fixed star: its length is 27 days, 7 hours, 43 minutes, 11·54 seconds. The *nodical* month is the time in which the moon makes a revolution with respect to her nodes, the line of which is moveable: its length is 27 days, 5 hours, 5 minutes, 36·6 seconds. These mean motions are subject to periodic and secular variations.

LU'NAR YEAR. [See CALENDAR.]

LUNA'TION, the time in which the moon passes through all her phases.

LUNE, or LUNU'LE (*luna*, the moon; or *lunula*, a little moon: *Lat.*), in Geometry, a plane in the form of a crescent or half-moon, enclosed by the circumferences of two circles that intersect each other.

LUNETT'E (*Fr.*), in Architecture, an aperture for the admission of light in a concave ceiling, as the upper lights of the naves of St. Peter's at Rome, and St. Paul's in London.——In Fortification, an enveloped counterguard, or elevation of earth made beyond the second ditch; or a covered place before the curtain, consisting of two faces that form an angle inwards.

LUNGS (*lunge: Ger.*), in Anatomy, two viscera situated in the chest, by means of which our blood is oxygenated. The substance of the lungs is of four kinds, viz. vesicular, vascular, bronchial, and parenchymatous. The vesicular substance is composed of the air-cells; the vascular invests those cells like a network; the bronchial is formed by the ramifications of the bronchia throughout the lungs, having the air cells at their extremities; and the spongy substance that connects these parts is termed the *parenchyma*. To the touch they are soft and elastic; and of all the organs, they have the least specific gravity. Their air-cells expose a very large surface for the purification of the blood, by means of the oxygen of the air, which is not prevented, by the interposition of their membranous coverings from uniting with the carbon of the blood.

LUNIS'TICE (*luna*, the moon; and *sto*, I stand: *Lat.*), in Astronomy, the farthest point of the moon's northing and southing, in her monthly revolutions.

LU'NULAR, or LU'NULATE (*luna*, the moon: *Lat.*), in Botany, resembling a crescent: shaped like the new moon.

LU'PINE (*lupinus: Lat.*), in Botany, a genus of leguminous plants, chiefly annuals, bearing digitate leaves and papilionaceous flowers, which are usually disposed in a terminal raceme. The legumes of some species are used as food.

LU'PULIN (*lupulus*, the hop: *Mod. Lat.*), the fine yellow powder of hops. It has a penetrating aromatic odour, and is found to consist of minute resinous grains, which attach themselves to the fingers and render them rough.

LU'PUS (a wolf: *Lat.*), in Astronomy, the *Wolf*, a constellation of the southern hemisphere.

LURCH'ER (*lurcor*, I eat voraciously: *Lat.*), a variety of the *Canis familiaris*, a dog more used by poachers than sportsmen, having a narrow body, stout legs, straight tail, and long rough hair.

LU'SIAD, The, is the only Portuguese poem that has gained a European celebrity. It was written by Luiz de Camoens, who died in 1579, the first edition having appeared seven years previously. It was entitled *Os Lusiadas*, the Lusitanians, that is, the Portuguese, the subject being the conquests of that nation in India. It is divided into ten cantos, containing 1102 stanzas, in *ottava rima*. The voyage of Vasco de Gama is described, and his proceedings in India. Three cantos are taken up with an account of Europe, Portugal, and the deeds of the Portuguese monarchs, supposed to be related by De Gama to an Indian king. The gods of the ancient mythology are introduced, aiding or opposing his designs, whilst he addresses his prayers to the God of the Christians. Nereids and syrens are introduced, whilst in other passages we have the Roman Catholic worship of the Virgin—so confused and unintelligible is the supernatural element of the poem. It has been translated into English, and into several other European languages, but it has never been popular out of Portugal.

LUSTRA'TION (*lustratio*, from *lustro*, I purify, *Lat.*), in Antiquity, a ceremony of purification which the Romans performed on their fields, armies, and people, at various times, but particularly after the numbering of the people by the census every *lustrum*, or five years.

LUS'TRE (*Fr.*), a term very generally used in modern works on mineralogy. The lustre of minerals is of five kinds: 1. *splendent*, that is, when in full daylight, it can be seen at a great distance; 2. *shining*, when at a distance the reflected light is weak; 3. *glistening*, when the lustre is only observable at no greater distance than an arm's length; 4. *glimmering*, when the surface held near the eye in full daylight presents a number of shining points; 5. *dull*, when the surface has no brilliancy.

LUS'TRUM (*Lat.*, strictly speaking, a purification of the people after the completion of a census), in Roman Antiquity, a general muster and review of all the citizens and their goods, which was performed by the censors every fifth year, and followed by a solemn *lustration*. In course of time the *lustra* were not celebrated so often, for we find the fifth lustrum celebrated at Rome only in the 574th year of that city.

LU'SUS NATU'RÆ (a freak of nature: *Lat.*), something out of the ordinary course of nature.

LUTE (*liutio: Ital.*), a stringed instrument of music, containing at first only five strings, to which were afterwards added six more. It was formerly much used. The strings are struck with the right hand, and the stops are pressed with the left

LUTE, or LU'TING (*lutum*, clay: *Lat.*), in Chemistry, a paste, made of potter's clay, sand, and other materials, and used for closing up the necks of retorts, receivers, &c., in chemical experiments.

LU'THERANISM, the doctrines of Martin Luther, the German reformer, which constitute the creed of nearly all the Protestants in Germany. Luther was an Augustine friar, who separated from the church of Rome about the year 1515, and took the lead in the reformation. He held consubstantiation [which see]; used wafers in the administration of the Lord's Supper; allowed images in churches; encouraged private confession of sins; insisted on justification by faith alone; held that God, foreseeing man's actions, predestined him to happiness or misery according as they were good or bad—a doctrine which differs from that of Calvin, who maintained that God predestined man by his own mere will. The Lutherans of the present day consider themselves at liberty to dissent from these tenets, as they are answerable to God alone for their religious opinions.

LUXA'TION (*luxatio*, from *luxo*, I dislocate: *Lat.*), in Surgery, the dislocation of a bone from its proper cavity or articulation, so as to impede or destroy its motion or office

LUX'URY (*luxuria: Lat.*), an unrestrained indulgence in the pleasures of the table, in costly dress, equipage, &c. Amongst the Romans, luxury prevailed to such an extent that several laws were made to suppress, or at least to limit it. Apicius laid aside ninety millions of sesterces, besides an enormous revenue, for no other purpose than to be sacrificed to luxury; finding himself involved in debt, he looked over his accounts, and though he had the sum of ten millions of sesterces still left, he poisoned himself for fear of being starved to death. Instances might be adduced of great luxury amongst the Greeks; but the extravagance and luxury of both Greeks and Romans appear to be eclipsed by some of our own country. One instance of this kind will suffice. In the 10th year of the reign of Edward IV. (1470), George Nevill, brother to the earl of Warwick, at his instalment into the archiepiscopal see of York, entertained most of the nobility and principal clergy, when his bill of fare was 300 quarters of wheat, 350 tuns of ale, 104 tuns of wine, a pipe of spiced wine, 80 fat oxen, 6 wild bulls, 1004 wethers, 300 hogs, 300 calves, 3000 geese, 3000 capons, 300 pigs, 100 peacocks, 200 cranes, 200 kids, 2000 chickens, 4000 pigeons, 4000 rabbits, 204 bitterns, 4000 ducks, 200 pheasants, 500 partridges, 2000 woodcocks, 400 plovers, 100 curlews, 100 quails, 1000 egrets, 200 rees, 400 bucks, does, and roebucks, 1500 hot venison pasties, 4000 cold ditto, 1000 dishes of jelly parted, 4000 dishes of jelly plain, 4000 cold custards, 2000 hot custards, 300 pikes, 300 breams, 8 seals, 4 porpoises, and 400 tarts. At this feast the earl of Warwick was steward, the earl of Bedford treasurer, and Lord Hastings comptroller, with many more noble officers; there were 1000 servitors, 62 cooks, and 515 menial apparitors in the kitchen. But it must not escape our observation, that, after his extreme prodigality, this man died in the most abject but unpitied poverty

LYCAN'THROPY (*lukos*, a wolf; and *anthrōpos*, a man: *Gr.*). In ancient times, men were supposed, for certain periods, to be transformed by herbs into wolves. This superstition was continued down to a more recent period, but the transformation was attributed to sorcery. These supposed human wolves were called by the French *loups garous*; by the Saxons, *were-wolves*; and by the Germans, *wehrwölfe*: all the terms having the same meaning. The prevalence of such foolish ideas among the peasantry gave rise to the species of madness termed *lycanthropy*, in which the patient believed himself to be a wolf, and imitated the actions of that animal. This species of insanity seems to have vanished with the superstition which gave rise to it.

LYCE'UM (*Lukeion*, a famous gymnasium at Athens: *Gr.*), in Grecian Antiquity, an academy situated upon the banks of the Ilissus at Athens, near the temple of Apollo Lyceus. It contained porticos and promenades, where Aristotle taught philosophy From their walking there every day till the hour of anointing, he and his followers were called *peripatetics*.

LY'CIUM (the *box-thorn: Lat.*), in Botany, a genus of plants, nat ord. *Rhamnaceæ*. The species are shrubs, and consist of the different varieties of *box-thorn*.

LYCOPO'DIUM (*lukos*, a wolf; and *pous*, a foot: *Gr.*—from the shape of its extreme branches), or CLUB MOSS, a genus of cryptogamic plants allied to the ferns, the spores of which, when ignited, burn off in a flash. They are used in melodramatic pieces, &c., at the theatres.

LYCOP'SIS (bugloss: *Lat.*; from *lukos*, a wolf; and *opsis*, an appearance: *Gr.*—on account of the flowers having the appearance of a grinning mouth), in Botany, a genus of plants, nat. ord. *Boraginaceæ*. The species are annuals, consisting of various kinds of bugloss.

LYD'IAN MOOD, in Music, a term given to an effeminate kind of music, used first by the Lydians.

LYD'IUS LA'PIS, or LYD'IAN STONE, in Mineralogy, a stone of a greyish-black colour, which is found in Bohemia and other parts of Germany, and also in Scotland. When polished, it is used as a touchstone for determining the purity of gold and silver. It was used for that purpose among the ancients, from whom it received this name, because it was found only in the Tmolus, a river of Lydia.

LYMPH (*lympha*, water: *Lat.*), in Anatomy, a colourless fluid, or clear limpid secretion from the blood, which is carried by the lymphatic vessels into the thoracic duct, where it mixes with the chyle. Its constituents appear to be albuminous water and a little salt

LYMPHAT'ICS (same *deriv.*), in Anatomy, absorbent vessels, which carry the lymph from all parts of the body, and terminate in the thoracic duct.

LYNX (*lunx*: *Gr.*), a cat-like animal belonging to the tribe of *Felidæ*. There are several species, besides the European one. They form the genus *Lyncus* of zoologists, and are recognizable by the tufts of hair at the tips of the ears. The caracal and chaus of Asia, and the wild cat of the Canadians, are lynxes. The last is said to be extremely fond of odours, particularly that of castoreum, and this is frequently employed for its capture by the trappers. The lynx was said to be sacred to Bacchus, whose chariot was fabled to be drawn by it, but it seems probable that the panther was intended to be designated.——LYNXES, ACADEMY OF (*Academia dei Lincei*), Rome, the oldest scientific body in Europe. The allusion of the name is to the watchfulness and keen-sightedness of the lynx. Galileo was one of the founders.

LY'RA (*Lat.*), in Astronomy, a constellation in the northern hemisphere.——In Anatomy, a portion of the brain, having somewhat the appearance of a lyre.

LY'RATE, or LY'RATED (next), in Botany, an epithet for a leaf that is divided transversely into several rounded lobes, the lower ones smaller and more remote from each other than the upper, and the last large and rounded.

LYRE (*lyra*: *Lat.*; from *lura*: *Gr.*), a musical instrument of great antiquity, used by the Egyptians and Greeks. It is supposed to have had, at first, only three strings; afterwards it had eleven. It was played with a *plectrum*, or stick of ivory or polished wood, and sometimes with the fingers. The *lyre* is attributed by poets, painters, and statuaries, to Apollo and the Muses. It is said to have been originally formed of a tortoise-shell, whence it is sometimes called *testudo*.

LYR'IC (*lyricus*, pertaining to the lyre: *Lat.*), an epithet originally applied to what was sung or recited with an accompaniment on the lyre, but it is now applied to odes, ballads, and other verses, such as may be set to music. *Lyric poetry* was originally employed in celebrating the praises of gods and heroes, and its characteristic was sweetness It was much cultivated by the Greeks, particularly by Anacreon, Alcæus, and Sappho; but, among the Romans, Horace was the first and principal lyric poet.

M

M, the thirteenth letter of the English alphabet, is a liquid and labial consonant, pronounced by closing the lips. It is sometimes called a *semi-vowel*, as the compression of the lips is accompanied with a humming sound through the nose It was used by the Romans as an abbreviation for Marcus, Manlius, Martius, &c., and to denote 1000, for which, also, it is employed by the moderns. We use it as an abbreviation for *Magister*, as A M. *Artium Magister* (Master of Arts); *Medicinæ*, as M D. *Medicinæ Doctor* (Doctor of Medicine), *Mundi*, as A.M. *Anno Mundi* (in the year of the world); *Meridiem*, as A M *Ante Meridiem* (before midday or noon), and P.M *Post Meridiem* (afternoon). MS stands for *Manuscript*, and MSS for *Manuscripts* In medical prescriptions, M. stands for *Manipulus*, a handful, and sometimes for *Misce* (mix) and *Mistura* (a mixture). The French use M. for *Monsieur*, and MM. for *Messieurs*.

MAB, in northern Mythology, the queen of the imaginary beings called *fairies;* so fancifully described by the sportive imagination of Shakspeare, in Romeo and Juliet.

MAC, an Irish and Scotch word, signifying a son, frequently prefixed to the beginning of surnames, as Macdonald or M'Donald It is synonymous with the *Fitz* of the Normans, and *son* of the English.

MACAD'AMIZING, a method of making roads, first generally introduced by Mr. Mac Adam. It consists in breaking the stones so small that they may form with the earth a solid smooth mass

MACARO'NI or MACCARO'NI (*Ital.*). In Commerce, it is known as Genoese paste, and is in a tubular or pipe form, of the thickness of goose-quills. It is a favourite article of food with the Italians, especially the Neapolitans.——A term of contempt for a fop or coxcomb.

MACARON'IC or MACARO'NIAN (last), an appellation given to a burlesque kind of poetry, made up of a jumble of words of different languages, of Latin words modernized, or of native words ending in Latin terminations.

MACAW', the name of birds belonging to the sub family, *Arainæ*, of the parrot family. They are distinguished by having tails longer than their bodies, and by their strong beaks being hooked at the point.

MAC'CABEES, two apocryphal books of Scripture, containing the history of Judas and his brothers, and their wars against the Syrian kings in defence of their religion and liberties. The first book of the Maccabees, as a history, comes nearest to the style of the sacred historians The second begins with two epistles sent from the Jews of Jerusalem to the Jews of Egypt and Alexandria, to exhort them to observe the feast of the dedication of the new altar erected by Judas on his purifying the temple. The Jews never considered either of these to be canonical; they are, however, on the canon of the Roman Catholic church. There are two other books of the Maccabees which have never been considered as canonical by any church.

MACE (*masse*: *Fr.*; from *macis*: *Lat*), a thin coat called by botanists an *arillus*, covering the nutmeg, which is the nut or stone of a tropical tree, the *Myristica officinalis*. It is of an oleaginous nature and a yellowish colour, in flakes of an inch and more in length, which are divided into a multitude of ramifications. It is extremely fragrant, and of an aromatic and agreeable flavour.——MACE (*masse*, a lump: *Fr*), an ornamented staff, borne as an ensign of office before a magistrate. Originally the mace was a club or instrument of war, made of iron, and much used by cavalry.

MACERA'TION (*maceratio*, from *macero*, I make soft by steeping: *Lat.*), in Chemistry, the process by which the constituents of bodies are obtained, by soaking them in fluids. It differs from *digestion* only as the latter operation admits the application of heat.

MACH'IAVELISM, the principles inculcated by Machiavelli, an Italian writer, secretary and historiographer to the republic of Florence. The term is used to denote political cunning and artifice, intended to forward arbitrary power. 'Del Principe,' the work in which he recommends rulers to adopt the ways both of the lion and the fox, was written for the private perusal of the Medicis, and was not published until 1532, after the author's death.

MACHICOLA'TION (*mache*, something that catches fire; and *couler*, to drop down: *Fr.*), in Gothic and castellated Architecture, a parapet projecting beyond the face of the walls, and supported by arches springing from large corbels or consoles. The apertures between the arches and the walls were used for pouring down boiling water, melted lead, &c., upon the assailants.

MACHI'NE (*mēchanē*: *Gr.*). All machines are intended either to transmit or modify power: no combination of mechanical elements can produce it; on the contrary, the most perfect must destroy more or less of it by friction and inertia. The objects of machinery are to change mass into velocity, and *vice versâ*; to change the direction of a force; to change its nature by transforming it; for example, from a reciprocating rectilinear into a rotatory, and *vice versâ*; to distribute a vast power, such as that of a great steam-engine, in a multiplicity of channels, and render it capable of producing the most delicate effects, as in the cotton-manufacture, &c. Among the extraordinary capabilities of machinery is the production of some effects which human art, unaided by machinery, could never achieve. For instance, the same power which twists the stoutest cable, and weaves the coarsest canvass may be employed, with equal advantage, in spinning the gossamer thread of cotton, and entwining, with fairy fingers, the meshes of the most delicate fabric.

MACK'EREL (*makrele*: *Ger.*), in Ichthyology, the *Scomber Scomber*, a well known migratory fish, esteemed as an article of food, and possessing, when alive, great symmetry of form and brilliancy of colours. The mackerel is easily taken by a variety of baits, and always most easily during a gentle breeze, which is hence termed a *mackerel-breeze*.

MAC'LE, in Mineralogy, a name given to *chiastolite*, or hollow spar. It consists chiefly of silica and alumina, with a little oxide of iron.

MACLUR'ITE, a mineral, called after Maclure. It is a silicate of magnesia, with traces of potash, oxide of iron, and fluorine, and is imperfectly crystalline. Its colour is a brilliant pale green.

MAC'ROCOSM (*makros*, large; and *kosmos*, the world: *Gr.*), the *universe*, or the visible system of worlds; opposed to *microcosm*, or the world of man.

MACROSCEL'IS (*makros*, long; and *skelos*, a leg: *Gr.*), a genus of insectivorous mammals, allied to the moles and urchins. They are natives of Africa, possess long noses, and long hind legs. The elephant shrew of Algeria is the best known species.

MAC'ULÆ (*Lat.*), dark spots appearing on the luminous faces of the sun, moon, and even some of the planets. Sir W. Herschel supposed a luminous stratum to be sustained far above the level of the sun by a transparent elastic medium in which clouds float, and that some portions of the luminous stratum, and even of the clouds which would reflect a part of the light, are in certain instances removed by local agitations, &c., so as to produce these spots. The lunar spots are caused by shadows of its mountains, by vast caverns, and the unequally reflecting materials of which portions of it are composed. The planets have permanent spots in the shape of belts, &c. The diurnal revolutions of the sun and planets have been discovered by means of their spots.——MACULÆ, in Medicine, any discolorations in the surface of the body, or its different parts, which appear in the form of spots.

MAD'DER (*madere*: *Sax.*), the root of the *Rubia tinctorum*, or dyer's madder: a most important article, on account of the fine red colour it affords. It was undoubtedly known to the ancients. The madder plant has no pretensions to beauty; it externally resembles the *bed-straws*, to which it is allied. The root is the only part generally used, though the East Indian *munjeet* consists entirely of stalks, but it is very inferior. Its dye-stuff is extracted by water. The dye is of a complicated character, but its chief ingredients are *Alizarine* and *Purpurine*. The infusion is of a dirty red colour, but it is rendered bright and permanent by an aluminous mordant. Madder can be imported more profitably than it can be cultivated in England; it thrives best in a warm climate

MAD'NESS (*maad*, distracted in mind: *Sax.*), a dreadful kind of delirium, without fever, in which the patient raves or is furious. Melancholy and madness may be considered as diseases nearly allied. They differ only in degree, and with respect to the time of appearing: melancholy being the primary disease, of which madness is the complement. Both these disorders indicate a weakness of the brain, which may proceed from an hereditary predisposition; from violent disorders of the mind, especially long-continued grief, sadness, anxiety, dread, and terror; from close study, and intense application to one subject; from the use of narcotic and stupefying drugs; and from great excess or uncurbed indulgence in any passion or emotion. The treatment of madness is partly physical, partly mental. The leading indications under the first head are:—To diminish vascular or nervous excitement when excessive, as in mania; to increase them when defective, as in melancholia. In the mental treatment, it is necessary to inspire the unhappy victims with a certain degree of awe, from a conviction of superior power, and at the same time seek to gain their confidence by steadiness and humanity, while we endeavour to amuse them without making our design apparent. In former times, persons labouring under this fearful malady were subjected to every kind of inhumanity, as necessary for their cure or management; the enlightenment of modern times has put an end to this treatment, and the protection of the legislature has been specially extended to them.

MADON'NA (my lady: *Ital.*), a term applied in Italy to the Virgin, and hence to her pictures and statues.

MAD'REPORE (*madré*, spotted: *Fr.*; and *porus*, a pore: *Lat.*), the popular name of numerous tropical corals, none of which are hard enough to take a polish. The 'Brain Stone' is a madrepore.

MAD'RIGAL (*Fr.*), in Italian, Spanish, and French poetry, a short amorous poem, composed of a number of free and unequal verses, confined neither to the regularity of the sonnet, nor to the subtlety of the epigram, but containing some tender and delicate thought.

MAESTO'SO, in Music, an Italian word signifying *majestic*, and used as a direction to play the part slowly, and with grandeur.

MAGAZI'NE (*magasin*: *Fr.*), in Commerce, a warehouse for all sorts of merchandise.——In Literature, a periodical work containing miscellaneous matter. The earliest publication of this kind in England was the *Gentleman's Magazine*, which first appeared in 1731, and still flourishes.——In Military affairs, a store-house for arms, ammunition, or provisions.

MAGELLAN'IC CLOUDS, in Astronomy, three whitish cloud-like patches in the heavens near the south pole. They take their name from Magellan (or rather Magalhaens) the Portuguese navigator. They consist partly of large tracts and ill-defined patches of irresolvable nebulæ, nebulosity of every degree of resolvability, and perfectly ascertained stars, and partly of regular and irregular nebulæ, properly so called, globular clusters of various degrees of resolvability, and clustering groups. The larger one, which is four times the size of the other, contains altogether 919 stars, nebulæ, and clusters. These objects are of great complexity in their details. They are regarded as systems *sui juris*, and have nothing analagous in our hemisphere.

MAGGIO'RE, in Music, an Italian epithet signifying *greater*.

MAG'GOT (*magthe*: *Sax.*), the larva of the common blow-fly, hatched from the eggs in a few hours. On its changing to a pupa, the skin dries round it, and in ten days the fly emerges.

MAG'IC (*mageia*: *Gr.*), properly signifies the doctrine of the Magi; but the latter being supposed to have acquired their extraordinary skill from familiar spirits or other supernatural information, the word *magic* acquired the signification it now bears, viz. the power of performing wonderful things by the aid of demons. The *magicians* of antiquity were, in most cases, acquainted with certain not generally known properties and affinities of bodies, and were hence enabled to produce effects calculated to astonish the vulgar; and these surprising results, which were, in reality, due to natural causes, procured them credit in their pretensions to supernatural and miraculous power. Amongst civilized nations the belief in magic has died out except in a few sequestered places.——NATURAL MAGIC, the application of natural philosophy to the production of surprising though natural effects.

MAG'IC LAN'TERN, an optical machine, invented by Kircher, by means of which figures are represented on an opposite wall or screen in a dark room. This contrivance consists of a powerful lamp, within a closed lantern, and in the focus of a concave reflector, which is placed behind it. In front of the lamp is fixed a powerful hemispherical illuminating lens, and in front of this, in a sliding tube, a convex lens, or a system of lenses. Painted slides can be moved immediately in front of the illuminating lens. The strong light from the lamp, rendered more powerful by the illuminating lens, is transmitted through the painted slides; the resulting coloured rays are concentrated by the lens, or system of lenses, to a focus on a screen, &c., and greatly enlarged images of the figures on the slides are produced—the room being of course darkened; these images may be seen by persons at either side of the screen, which is of linen, &c. As the images on the screen must have an increase of light proportioned to their increased size, a very strong light is necessary; and hence gas, the oxyhydrogen lime light, &c., are occasionally employed. The slides admit of infinite variety, and they may be very effectually used to illustrate astronomy, &c.; they may even contain thin slices of wood, the wings of insects, &c., and thus may be a source not only of amusement, but of the most refined and useful instruction.

MA'GIC SQUARE, in Arithmetic, a square figure formed by a series of numbers, so disposed in parallel and equal rows, that the sum of those in each line, whether perpendicular, horizontal, or diagonal, is the same number. Thus,

1	16	11	6
13	4	7	10
8	9	14	3
12	5	2	15

MA'GISTRATE (*magistratus*: *Lat.*), any public civil officer to whom the executive power of the law is committed, either wholly or in part.

MAG'MA (any pressed or kneaded mass: *Gr.*), the name given to any crude mixture of mineral or organic matters, in a thin pasty state. Strictly speaking, it is what remains after the fluid parts have been expressed.——In Geology, the melted matter out of which the igneous rocks of our globe have been formed.

MAG'NA CHAR'TA (the great charta: *Lat.*), in English History, the Great Charta of Liberty, obtained by the English barons from king John, in 1215. The barons consisted of the whole nobility of England; their followers comprehended all the yeomanry and free peasantry, and the accession of the capital was a pledge of the adherence of the citizens and burgesses. John had been obliged to yield to this general union, and conferences were opened, on the plain called Runnymede, on the banks of the Thames, near Staines, in sight of the forces of each. At length the preliminaries being agreed on, the barons presented heads of their grievances and means of redress; and the king directed that the articles should be reduced to the form of a charter, in which state it issued as a royal grant. To secure the execution of this charter, John was compelled to surrender the City and Tower of London to be temporarily held by the barons, and consented that the latter should choose twenty-five of their number, to be guardians of the liberties of the kingdom, with power, in case of any breach of the charter, or denial of redress, to make war on the king, to seize his castles and lands, and to distress and annoy him in every possible way till justice was done. Many parts of the charter were pointed against the abuses of the power of the king as lord paramount; the tyrannical exercise of the forest laws was checked, and many grievances incident to feudal tenures were mitigated or abolished. But besides these provisions, it contains many for the benefit of the people at large, and a few maxims of just government applicable to all places and times.

MAGNE'SIA (*Magnēsia*, a city in Asia Minor: *Gr*.), in Chemistry, the oxide of MAGNESIUM, a white tasteless substance, with a slight alkaline reaction, usually obtained by exposing the carbonate to a full red heat. In combination with other substances it is an abundant earth. The well-known Epsom Salt is a sulphate. The carbonate is the *Magnesia alba* of pharmacy. In the state of a silicate it is a principal ingredient in STEATITE, MEERSCHAUM, SERPENTINE, and JADE. Every ton of seawater is said to contain about two pounds weight of magnesia.

MAGNE'SIAN LI'MESTONE, in Geology, a rock composed of the carbonates of lime and magnesia, and a principal member of the PERMIAN group, the uppermost member of the Palæozoic series. The DOLOMITE of the continent is a magnesian limestone. In England this rock constitutes an extensive series of beds, lying immediately above the coal measures. Their imbedded organic remains show that they were deposited in the sea. The lime resulting from the calcination of magnesian limestone has an injurious action on vegetation, because, having less affinity than common lime for carbonic acid, it remains longer in a caustic state.

MAGNE'SITE, in Mineralogy, *Rhomb spar*, the native carbonate of magnesia; it is found with serpentine and other magnesian rocks.

MAGNE'SIUM, a white, lustrous, malleable metal, which fuses at a red heat and oxidizes in hot water. When heated in the air it burns brilliantly with a pure white flame, and leaves magnesia behind. Its specific gravity is only 1·75. It is therefore extremely light, and 12½ cubic inches of it are required to balance one cubic inch of platinum. The intensity and actinic power of the light emitted by ignited magnesium wire have caused it to be employed in photography. The spectrum of ignited magnesium vapour has such points of resemblance to that of the sun as to lead to the supposition that this metal exists in the solar atmosphere.

MAG'NET, NAT'URAL (*magnēs: Gr.*), the *loadstone*, one of the many combinations of iron and oxygen; it consists of two oxides with a little quartz and alumina [see LOADSTONE]. Its colour depends on the relative proportions of its constituents, but it is generally dark grey, with a dull metallic lustre. It attracts iron in all states, except as oxide; formed into a bar and suspended freely, it will arrange itself parallel with the magnetic meridian; it will magnetize steel permanently, and soft iron while near it. Being supposed by the earlier navigators always to point to the north pole of the earth, it was termed the load-stone, or leading stone. Its use has long been superseded by the artificial magnet, which is far more powerful and convenient.

MAGNET'IC NEED'LE, a magnetized bar of steel moving freely on a centre, and showing the direction of the *resultant* of the magnetic forces, at the place where it is. [See COMPASS.]

MAGNET'IC PYRI'TES, native black sulphuret of iron. It has magnetic properties.

MAG'NETISM, that science which investigates the phenomena exhibited by natural and artificial magnets, and the laws by which they are governed. Some of the properties of the magnet were known to the ancients, but they were not acquainted with its directive power, that is, its tendency to assume a certain position when at liberty to do so. If a light bar of steel be suspended horizontally by a silk thread, or balanced on a pivot, and then magnetized, it will, except at the magnetic equator, lose its horizontal position, making an angle with the horizon called the *angle of dip*, and will no longer rest in every position, but will assume one in a direction north and south, but making a small angle with the plane of the terrestrial meridian, termed the *angle of variation*. These two angles are subject to perpetual but slight changes. The *magnetic equator* seems to cross the terrestrial at four points. The lines at which the angles of dip are equal are called *magnetic parallels*. There are probably no precise points which can be called *magnetic poles*. The earth being a great magnet, its poles are rather regions than points. Even in the ordinary artificial magnet, the poles are diffused over comparatively large spaces. The earth is most probably an *electro-magnet*, magnetized by the electric currents continually circulating round it, and which are due to evaporation, &c. The lines formed by points on the earth's surface, at which the variation is equal, are called *lines of* *equal variation.* The rapidity with which a needle vibrates, if drawn from its natural position, is a measure of the intensity of magnetism at that time and place; and this intensity is subject to constant change. A magnet, if placed in iron filings will attract them in quantities large at its poles, and diminishing towards the centre, to which none adhere. The poles of a magnet will attract pieces of soft iron; and these, as long as they are in contact with the magnet, will themselves be magnetic, and will attract other pieces of iron or iron filings. If soft iron be brought *near* a magnet, it will be magnetized, and, as long as it is near it, will attract iron filings, &c. The interposition of paper, glass, &c., will not cause the magnetic influence to be intercepted; if a magnetized bar of steel be placed under a sheet of paper, iron filings scattered over the paper will arrange themselves in *curves* over the poles. When soft iron is removed from the magnet, it instantly ceases to be magnetic; steel is not so powerfully magnetized, but, on removal, it retains more or less of the magnetism. If a magnetized bar is broken, two magnets will result, and the fractured ends will be opposite poles. Each pole of a magnet is attracted by one pole of another magnet, and repelled by the other pole. A magnet may be made by striking a bar of steel on one end while it is in the direction which a needle would assume if at liberty, or by rubbing each end continually in the same direction with one pole of a magnetized bar. Iron rods or bars acquire polarity by standing long in one position; magnetism is destroyed by a red heat. If discs of various metals are put in rapid rotation, they will become magnetic, since they will deflect the needle—an effect not due to vorticity produced in the air, since it is more powerful *in vacuo.* Magnetic attraction and repulsion vary inversely as the squares of the distance.

MAG'NETISM, AN'IMAL, a sympathy supposed to exist between the magnet and the human body. The origin of the term was a fancied analogy between the action of the mineral magnet and that of the animal energy, or *vis vitæ,* to which these effects were attributed, but its results have been ascribed to excitement and morbid sensitiveness. It originated thus:—A German physician, named Mesmer, in 1772, attempted cures with the mineral magnet, and excited some sensation in Vienna; but at length declared that the effect was produced, not by the magnet, but by a mysterious power in his own person, and that this power was related not only to the magnetic power, but to the attraction dispersed throughout the universe. From Vienna he went to Paris, where he gained many proselytes to his pretended discovery. The government at length appointed a committee, among whom was Dr. Franklin, to investigate the pretensions of Mesmer; and the result of their inquiries appeared in a memoir, by M. Bailly, which condemned animal magnetism. After the lapse of half a century, it has again revived, and numbers of eminent persons are among its votaries. Though Mesmer is considered to be its discoverer, it was undoubtedly practised by many persons, and in various forms, long before him.

MAGNE'TOGRAPH (*magnes,* a magnet; *grapho,* I write, *Gr.*), an apparatus for registering the variations of the phenomena of terrestrial magnetism. It can be made self-recording.

MAGNETOM'ETER, an instrument or apparatus for determining the elements of terrestrial magnetism, as to direction and force. When adapted for determining the declination of the needle, it is called a *declinometer;* and when for the inclination and vertical force, it becomes an *inclinometer.*

MAG'NIFYING POW'ER (*magnus,* great; and *facio,* I make: *Lat.*), in Optics, the enlargement of the angle under which an object is seen. It is effected in telescopes and microscopes by producing an image of the object, then viewing the image by another glass, and thus enlarging the angle, which becomes greater on account of the smaller distance of the image from the eye.

MAG'NITUDE (*magnitudo,* greatness: *Lat.*), whatever is made up of parts locally extended, or has dimensions; as a line, surface, solid, &c. The apparent magnitude of a body is that measured by the visual angle, formed by rays drawn from its extremes to the centre of the eye; so that all objects seen under the same or equal angles appear equal, and *vice versâ.*

MAGNO'LIA, in Botany, a genus of trees and shrubs, natives of North America and Asia; nat. ord. *Magnoliaceæ.* The *Magnolia grandiflora,* or the great magnolia, is the principal species. It is a native of Florida, and is remarkable for its large evergreen leaves and white flowers, which are conspicuous at a great distance. Two others of the species also deserve particular notice. One is the *Magnolia macrophylla,* the leaves of which are between two and three feet long, and the flowers upwards of a foot in diameter. The petals are from six to nine in number, and the three exterior ones have a purple spot at the base. It grows in the south-western parts of the Alleghanies. The other is the *Magnolia glauca,* or beaver-wood, a beautiful shrub, with leaves and flowers much smaller than any of the rest of the genus. The flowers are very elegant, and diffuse a delightful fragrance; the leaves and wood have also a strong aromatic taste. [See TULIP TREE.]

MAG'PIE (*Mag,* for *Margaret,* as *Poll* is used with a parrot; and *pie,* from *pica: Lat.*), in Ornithology, the *Pica caudata,* a well-known chattering bird, resembling in its habits and manners the other birds of the crow family, to which it belongs. It has a black bill, wings, and tail; but the two latter are variegated with white, green, purple, and blue, of different shades. When taken young, magpies readily become domesticated, and learn to repeat many words and sentences, as well as to imitate every noise within hearing.

MA'HA RA'JAH, MA'HA RA'NEE, titles in the East Indies, signifying Great Rajah and Great Queen.

MAHOG'ANY, the wood of a tree, the

Swietenia Mahogani of botanists; nat. order *Cedrelaceæ*, growing in America and the West Indies. The trunk of this majestic tree is often 40 feet in length, and 6 feet in diameter; and it divides into so many massy arms, and throws the shade of its shining green leaves over so vast an extent of surface, that few more magnificent objects are to be met with in the vegetable world. The principal importations of mahogany into Great Britain are made from Honduras and Campeachy. It was first brought to England in 1724. A single tree, cut into three logs, has been sold for 1800*l.* 20,000 tons per annum are imported—a quantity obtained from about 16,000 trees. There are many different sorts of mahogany, some of very inferior character. It answers well for ship-building; but it is not approved of at Lloyd's, in consequence, it is said, of its not being always possible to ascertain whether or not a good kind has been employed. The mahogany which was used in the line-of-battle ship *Gibraltar* was made into furniture after being in use 100 years.

MAHOM'ETANS, or MOHAM'MEDANS, believers in the doctrines and divine mission of Mahomet, the warrior and prophet of Arabia, whose creed maintains that there is but one God, and that Mahomet is his prophet; and teaches the use of prayer, washings, &c., almsgiving, fasting, sobriety, pilgrimage to Mecca, &c. Besides these they have some negative precepts and institutions of the Koran, in which several things are prohibited; such as usury, the drinking of wine, all games that depend upon chance, the eating of blood and swine's flesh, and whatever dies of itself, is strangled, or is killed by accident or by another beast. These doctrines and practices Mahomet established by the sword, by preaching, and by the Alcoran or Koran, which contains the principles of his religion; and he and his followers met with such success as in a few years to convert half the known world. [See ALCORAN.]

MAI'DEN (*magd*, a maid: *Ger.*), an instrument formerly used in Scotland for beheading criminals. It consisted of a broad plate of iron about a foot square, very sharp at the lower part, and loaded above with lead. At the time of execution it was raised to the top of a frame about ten feet high, with a groove on each side for it to slide in. The prisoner's neck being fastened to a bar underneath, and the sign given, the maiden was released, and instantly severed the head from the body. It was the prototype of the French guillotine. ——MAIDEN ASSIZE, an assize in which no person is condemned to death.

MAIL (*maille: Fr.*), a coat of steel network or scales, formerly worn for defending the body against swords, lances, &c. It was of two sorts, chain and plate mail; the former consisting of iron rings, each having four others inserted into it; the latter, of a number of small plates of metal, laid over one another like the scales of a fish, and sewed down to a strong linen or leathern jacket.——In ships, a square machine, composed of rings interwoven like net-work, used for rubbing off the loose hemp on lines and white cordage.

MAILED (*maculatus*, spotted: *Lat.*), in Heraldry, a term for speckled, as the feathers of hawks, partridges, &c.

MAIM, or MAY'HEM, in Old English Jurisprudence, any injury which rendered a person less fit to defend himself in fight; and differing, therefore, from that which merely disfigured. Cutting and stabbing, 'with intent to murder,' and 'with intent to maim or disfigure,' are now distinct offences.

MAIN (*magne: Old Fr.;* from *magnus*, great: *Lat.*), in Military and Naval affairs, a word prefixed to many others, and signifying *principal*, as, the *mainguard, mainmast, mainsail*, &c.

MAIN'PRIZE (*main*, a hand; and *prise*, a taking: *Fr.*), in Law, the receiving into friendly custody, security being given for his forthcoming on a day appointed, a person who might otherwise be committed to prison. The writ of mainprize is obsolete.

MAIN'TENANCE (subsistence: *Fr.*), in Law, an unlawful maintaining or supporting a suit between others, by stirring up quarrels, or interfering in a cause in which the person has no concern. But it is no maintenance where a person gives a poor man money out of charity to carry on a suit.——CAP OF MAINTENANCE, a cap of dignity, anciently belonging to the rank of duke. The name, also, of the lord-mayor's fur cap.

MAIZE, or INDIAN CORN, a plant of the genus *Zea*, the native corn of America. The root is fibrous; the stems rise to the height of from four to ten feet; and, like other grasses (for it belongs to the natural family *Graminaceæ*), they are furnished with knots at intervals. The styles are very numerous, six to eight inches long, and hang down like a silken tassel from the extremity of the foliaceous envelope; the seeds or grains are rounded externally, angular and compressed at the sides, and tapering towards the base, and are disposed in several longitudinal series. Maize is now very extensively cultivated, not only in America, but throughout a great part of Asia and Africa, as also in several countries in the south of Europe. In many of the provinces of France it forms almost exclusively the sustenance of the inhabitants. The spikes or ears are gathered by hand; the husks, when perfectly dry, are stripped off, and, together with the stalks, laid by for winter fodder, while the ears are conveyed to the granary. Next to wheat, it is considered the most nutritious grain.

MA'JESTY (*majestas: Lat.*), a title given commonly to kings. It was first used in England in the reign of Elizabeth, instead of '*highness*.'——*Apostolical Majesty*, a title bestowed on Stephen, duke of Hungary, A.D. 1000, by Sylvester II.; reconferred on the empress queen Maria Theresa, in 1758, and now borne by the emperors of Austria.——*Catholic Majesty*, a title conferred on Ferdinand and Isabella of Spain, in 1491, by Alexander VI., and now borne by the Spanish sovereign.——*Most Chris* *tian Majesty*, a title bestowed on Louis XI. of France, in 1469, by Paul II.——*Most Faithful Majesty*, a title conferred on John V. of Portugal, by Benedict XIV., and borne by the kings of that country.

MAJOL'ICA WARE, a ceramic manufacture so termed, probably from having been first made in Majorca. It was made in Spain by the Moors, but Italy was the place of its full development. The best was made at Faenza. The ware was formed of red earth, coated with a white glaze, and then painted upon with bright colours. The specimens most prized possessed a peculiar metallic opalescent lustre, which cannot be imitated by modern manufacturers. The ware made at Gubio has been termed *Raphael ware*, under the erroneous notion that this painter had worked upon it.

MA'JOR (greater: *Lat.*), the title of several military officers; as, *major-general*, the officer next in rank to a lieutenant-general. The *major of a regiment*, an officer immediately inferior to a lieutenant-colonel. There were no majors in regiments until the beginning of the 17th century; and there are still none in the artillery or engineers.——MAJOR, in Logic, the first proposition of a regular syllogism, containing the principal term.——In Music, an epithet applied to those modes in which the third is four semitones above the key-note, and to intervals consisting of four semitones. *Major* and *minor* are applied to concords which differ from each other by a semitone.

MAL'ACHITE (*malachē*, the mallow flower: *Gr.*), in Mineralogy, the blue and green carbonate of copper, found frequently crystallized in long slender needles. It takes a good polish, and is often manufactured into vases and other ornaments.

MALAC'OLITE (*malakos*, soft; and *lithos*, a stone: *Gr.*), in Mineralogy, a variety of *Augite*, of a dark green colour.

MALACOL'OGY (*malakia*, the Aristotelian name for the molluscs, or animals inhabiting and forming shells: from *malakos*, soft; and *logos*, a discourse: *Gr.*), the natural history of the *molluscs*, which see.

MALACOPTERY'GIANS (*malakos*, soft; and *pterux*, a wing: *Gr.*), an order of fishes comprehending those that have a bony skeleton and fins without spinous rays. If ventral fins are present they are abdominal

MALACOS'TOMOUS (*malakos*, soft; and *stoma*, a mouth: *Gr.*), an epithet for those fishes destitute of teeth in the jaws, vulgarly called *leather-mouthed;* as the tench, carp, bream, &c.

MALA'RIA (*Ital.*), a state of the atmosphere or soil, or both, which, in certain localities, in the warm season, produces a fever more or less violent, according to the nature of the exposure. The country of the *mal' aria*, in Italy, extends from Leghorn to Terracina, about 200 miles, and from the sea to the Apennines, from 25 to 30 miles, besides being found in other particular places. The city of Rome has been gradually invaded by it; so that not only the whole of ancient Rome has been deserted, but even the finest parts of the modern city, particularly those which are least inhabited, have become unsafe. Even in the time of Horace, Rome was deserted, two months in the year, on account of malaria.——It has been found from observation, that although standing waters, when clear and free from smell, and all running waters, are considered perfectly salubrious, they may, in fact, be nearly as injurious as those that are putrid and stagnant; and that, besides marshes, fresh and salt meadows, and wet pasture lands generally, all woods, coppices, thickets, rivers, lakes, ponds, ornamental waters, pools, ditches, plashy and limited spots of ground generally, send forth more or less of this noxious vapour; that wherever, in short, any chemical compound of the vegetable elements is wetted, or held in solution by water, there the poison in question may be, or will be, produced, provided the temperature be sufficiently high; that the smallest surface coming under any of the above denominations is sufficient to produce malaria.

MAL'ATES (*malum*, an apple: *Lat.*), in Chemistry, salts formed by the union of malic acid with different bases. The malates of potash, soda, and ammonia are deliquescent.

MALE SCREW, in Mechanics, a screw that has the spiral thread on the outside of the cylinder.

MAL'IC A'CID (*malum*, an apple: *Lat.*), in Chemistry, an acid which is present in the stalks of garden rhubarb, and the juice of many fruits, especially apples and pears. It may be obtained also from the *Sorbus aucuparia*, or mountain ash, and has therefore been called *sorbic acid*.

MALLEABIL'ITY (*malleus*, a hammer: *Lat.*), that property of metals, on account of which they are capable of extension by the hammer, and of being worked into forms. It is opposed to *brittleness*.

MAL'LEUS (same *deriv.*), in Anatomy, a bone of the internal ear, attached to the *membrana tympani*, and somewhat resembling a hammer in shape.

MAL'LOW (*malva: Lat.*), plants of the genus *Malva*, of which several species are wild in Britain. [See MALVACEÆ.]

MALM'SEY (*malvoisie: Fr.;* from *Malvasia*, a town in European Turkey, near which it was produced), the name of a species of grape, and also of a luscious kind of wine prepared from it. The most celebrated Malmsey was made in Madeira.

MALT (*mealt: Sax.*), grain, usually barley, which has been induced to germinate, and the germination suddenly checked, the object being to convert the starch of the grain partially into sugar. The grain is first steeped in water and then spread out on floors, to the depth of three or four inches, when it germinates. This goes on for some days, the grain being frequently turned, and then the germination is stopped by being transferred to a malt kiln.——*Malt kilns* are chambers having numerous holes in the floor, through which the heat ascends from a furnace below, and dries the malted grain that is laid upon it.

MAL'THA (a mixture of pitch and wa

for caulking ships: *Gr.*), a mineralogical name for a mineral pitch. A cement composed of this, with wax plaster and grease, was used by the Romans for coating their walls. Pitch, melted with lime, was employed by them for covering the interior of their aqueducts. The pavements termed *asphaltic*, used by us, are of a similar composition.

MA'LUM IN SE (a thing bad in itself: *Lat.*), an offence at common law: in distinction from *malum prohibitum;* such as smuggling.

MALVA'CEÆ, a natural order of exogenous plants, abounding in mucilage, and frequently having a tough fibre in the bark. The seeds are placed round a common axis. To this order belong the common mallow, the hollyhock, and the COTTON plant (*Gossypium*), as well as the various species of Hibiscus, several of which are cultivated for their flowers. One species yields SUN hemp. *Abelmoschus esculentus*, a plant of this order, which is cultivated extensively in Africa, on account of its seeds, called Ochro and Gobbo, which are used in soups.

MALVERSA'TION (*Fr.*), in Law, misbehaviour in an office, employ, or commission: such as breach of trust, extortion, &c.

MAM'ALUKES, or **MAM'ELUKES** (*memalik*, a slave: *Arab.*), male slaves imported from Circassia into Egypt by the rulers of that country. They were instructed in military exercises, but soon exhibited a spirit of insubordination; assassinating the sultan Turan Shah, and, in 1258, appointing Ibegh, one of their own number, sultan of Egypt. They were at length conquered by Selim I., and Cairo, their capital, was taken by storm, after they had governed Egypt 263 years. During the French invasion of Egypt by Buonaparte, the Mamelukes formed a fine body of cavalry, and for a time seriously annoyed the invaders, though many afterwards joined them. Mohammed Ali, the pacha of Egypt, annihilated their power, by destroying 470 of their principal leaders, in 1811, by treachery.

MAM'MAL, or **MAM'MIFER** (*mamma*, a teat; and *fero*, I bear: *Lat.*), in Zoology an animal the female of which has breasts for suckling its young.

MAMMA'LIA (*mamma*, a teat: *Lat.*), the most highly organized class of vertebrate animals, the females of which possess mammary glands, and suckle their young. Their chief anatomical character consists in their having lungs, which are suspended freely in a thoracic cavity, and separated from the abdomen by a perfect diaphragm. Their heart contains four distinct cavities. Their brain consists of a cerebrum, cerebellum, and medulla oblongata. They all bring forth their young alive. The teeth indicate the kind of food: to cut flesh the molars must be trenchant and serrated; for bruising grains, they must have flattened crowns. Those having hoofs are termed *ungulate;* the others *unguiculate.* The ungulate must be herbivorous, and therefore have molars with flattened crowns, since the formation of their feet would not permit them to seize living prey. The mammalia have been divided into two classes, the Placentalia and Implacentalia. Class I. The *Placentalia*, or those having a placenta or a vascular chorion, by which the fœtus is attached to the uterus, is divided into—1. The *Bimana*, or two handed, whose posterior extremities are used only to keep them in an erect position, and for the purpose of locomotion. They comprehend the different varieties of man. 2. The *Quadrumana*, or those having four hands; whose hinder extremities, in some instances, resemble hands more than the anterior—the thumb being sometimes wanting, or incapable of being opposed to the other digits. They comprehend the ape, monkey, &c. 3 The *Cheiroptera*, or those having the anterior extremities so modified as to serve for wings, the fingers being lengthened, and connected together by a thin membrane. They comprehend the different kinds of bats. 4. The *Insectivora*, or insect-eaters They comprehend the shrew, mole, hedgehog, &c. 5. The *Carnivora*, or flesh-eaters. Their teeth are well adapted for tearing, dividing, and bruising flesh. Those which tread on the sole of the foot are termed *plantigrades;* and those which run on the last joints of the toes, *digitigrades.* They comprehend the dog, cat, bear, seal, &c. 6. The *Cetacea*, or whale tribe. They live in the sea, or large rivers. The caudal fin is horizontal, not vertical, as in the true fishes. They comprehend the whale, porpoise, &c. 7. The *Pachydermata*, or thick-skinned. They are distinguished by the thickness of their skins, and comprehend the hippopotamus, elephant, horse, hog, &c 8. The *Ruminantia*, or those which chew the cud. They have cloven feet, want incisors, and have a stomach with four cavities. 9. *Edentata*, or those having imperfect dental apparatus. Their digits are generally sunk in large and crooked claws. They have no incisors, and sometimes no dental organs. They comprehend the sloth, anteater, armadillo, &c. 10. The *Rodentia*, or those animals which gnaw. They have two long chisel shaped incisors in each jaw, and no canine teeth, but a vacant space between the molars and incisors. The lower jaw has no horizontal motion, except from back to front, and *vice versâ.* The eminences on the crowns of the molars are transverse, so as to be opposed during the reciprocating motion of the lower jaw. The posterior are generally larger than the anterior parts, and hence they rather leap than walk. The brain is of an inferior type; the eyes are lateral. Some of them use their feet to convey their food to the mouth. They comprehend the rat, squirrel, rabbit, guinea-pig, &c. Class II. The *Implacentalia*, or those having no placenta or vascular chorion, are divided into—1. The *Marsupiala*, or pouched, which have the abdominal integument folded inwards, forming a depression containing the mammæ, or a pouch for the temporary shelter of their young. The fœtus is not attached to the uterus; it is prematurely born—in the great kangaroo after a gestation of only 38 days, at the end of which period it does not exceed an inch in length. It is then received into the pouch, where, adhering to the nipple, it remains for many months. 2. The *Monotremata*, or those having but one outlet for the excremental and generative products. They are ovo-viviparous; that is, extrude the living fœtus, more or less extricated from the egg coverings which had been developed within the body of the parent. They include only two genera, both found in Australia, the Ornithorhynchus and the Echidna. Another arrangement of the class is by a division into five orders. Order I. Primates, including man, the monkies, lemurs, and bats. Order II. Feræ, the rapacious beasts, including the feline family, with bears, moles, kangaroos, and seals. Order III. Cetacea, the whales, including dolphins and manatees. Order IV. Glires or rodents, including hares, mice, porcupines &c., Order V. Ungulata or hoofed beasts, including ruminating animals, horses, elephants, armadillos, and sloths.

MAM'MEE-TREE, in Botany, the *Mammea Americana*, a large and beautiful tree, belonging to the nat. ord. *Guttiferæ:* sometimes called the West Indian apricot, the fruit of which is highly esteemed for its sweet and very agreeable taste, accompanied with an aromatic, pleasant odour. The leaves are oval, six or eight inches in length; the flowers white, an inch and a half in diameter, and emit a delightful perfume; and the tree attains the height of sixty or seventy feet.

MAM'MILLARY (*mammilla*, a little teat: *Lat.*), pertaining to the breasts. Also, an epithet applied to two small protuberances, like nipples, found under the fore ventricles of the brain, and to a process of the temporal bone.

MAM'MOTH (*Tart.*), an extinct species of elephant entirely distinct from the existing species of Asia and Africa. It is found in all parts of Europe, Asia, and America, but only in the fossil state; and its remains have given rise to stories of giants. A mammoth, in complete preservation, was seen by Adams, a traveller in Siberia. The skeleton was 9 feet 4 inches high, and 16 feet 4 inches long; the tusks were 9 feet long. It is very different from the *mastodon*, a gigantic fossil animal of North America.

MAN, the *Homo sapiens* of zoologists, is placed as an animal in the family *Bimana* of the mammalian order *Primates*. He possesses two prehensive hands, with fingers protected by flat nails; two feet with single soles, a single stomach, and three kinds of teeth—incisive, canine, and molar. His position is upright; his food both vegetable and animal; his body without natural covering. Blumenbach divides mankind into five varieties. 1. The first occupies the central parts of the old continent, namely, Western Asia, Eastern and Northern Africa, Hindostan, and Europe. Its characters are the colour of the skin, more or less white or brown; the cheeks tinged with red; long hair, either brown or fair; the head almost spherical; the face oval and narrow; the features moderately marked; the nose slightly arched; the mouth small; the front teeth placed perpendicularly in the jaws; the chin full and round. This is called the *Caucasian*, from its supposed origin in the Caucasus. 2. The second variety has been termed the *Eastern*. The colour in this race is yellow; the hair black, stiff, straight, and rather thin; the head almost square; the face large, flat, and depressed; the features indistinctly marked; the nose small and flat; the cheeks round and prominent; the chin pointed, the eyes small. This variety comprises the Asiatics to the east of the Ganges and of Mount Beloor, except the Malays: it includes the Turks, Egyptians, Persians, Hindoos, the Tartars, Chinese, &c. 3. The *American* variety resembles the last described, in several points. Its principal characters are a copper colour; stiff, thin, straight, black hair; low forehead; eyes sunk; the nose somewhat projecting; cheekbones prominent; face large. This variety comprises all the Americans except the Esquimaux. 4. The fourth variety is called by Blumenbach the *Malay*, and described as of a tawny colour; the hair black, soft, thick, and curled; the forehead a little projecting; the nose thick, wide, and flattened; the mouth large; the upper jaw projecting This variety comprehends the Islanders of the Pacific ocean. 5. The remaining variety is the Negro. Its characters are, colour black; hair black and woolly; head narrow; forehead convex and arched; cheekbones projecting; nose large, and almost confounded with the upper jaw; the upper front teeth obliquely placed; the lips thick; the chin drawn in; the legs crooked. This race is found in Western and Southern Africa, and the great islands of the Pacific, generally in the interior. There are very great differences in the tribes included in this variety; witness the Negro, with the complexion of jet, and woolly hair; the Caffre, with a copper complexion and long hair; the sooty Papous, or New Guineaman; the native of Van Diemen's Land; and the Hottentot.——Man is the only animal which really possesses the powers of speech, by which he is enabled to communicate his thoughts; and this has led, in different tribes, to the invention of several hundred languages. He is also the only animal which possesses the muscles of laughter. ——MAN, a word variously used in nautical affairs: thus, *man-of-war*, a *merchantman*, &c. Also, '*man* a prize;' '*man* the topsail sheets;' '*man* the yards,' &c., signifying to supply either of these with the men necessary for the required purpose.

MAN'AKIN, the popular name of some small South American birds, forming the sub-family *Piprinæ*. They belong to the chatterers in the dentirostral section of the *Passeres*. *Pipra militaris*, a member of the typical genus, bears a crest of red feathers on its head.

MANA'TUS, or MANA'TEE (*manus*, a hand: *Lat.*), the Cow-fish, a genus of mammals, dwelling in water, and belonging to the order of *Cetacea*. The thick skin has a dark colour, and usually bears a few bristle like hairs. The skull is large and strong, without front teeth; the lips thick, fleshy, and bristly. The fore limbs or paddles are highly developed, with bones exactly answering to those of the human arm, the five fingers being present, but covered with inflexible skin. There are no rudiments of hind limbs. The body is terminated posteriorly by a horizontal semi-circular flat tail, but without a fin. The ears are small orifices; the eyes are also small. White milk flows from the breasts of the female when pressed. This harmless animal feeds on grass and aquatic plants. It is a rapid swimmer, and so cautious that it is not easily captured. Beneath the skin there is a thick layer of fat which yields abundance of oil. The flesh is said to be palatable, having a flavour between that of beef and pork. There appears to be several species. One, the *Dugong*, inhabits the rivers of Western Africa. Another is found in the West Indies and along the coast of Guiana. This is said to be from 12 to 20 feet long, and to possess nails at the extremities of the fore limbs. In the river Amazon there is a third species, which does not exceed 7 or 8 feet in length, and has no nails.

MANCHINEEL' (*mancinella: Span.*), the *Hippomane mancinella* of botanists, nat. ord. *Euphorbiaceæ*, a tree which grows in the West Indies to the size of a large oak. It is said to be death to sleep beneath its shade. A drop of the juice falling on the skin is known to form an ulcer. The tempting fruit, which looks like an apple, causes a burning sensation when applied to the lips.

MANDA'MUS (we command: *Lat.*), in Law, a writ issued from the Court of King's Bench, and directed to any person, corporation, or inferior court, commanding the performance of some special thing. It will not be granted unless there has been a distinct refusal to do that which is its object.

MANDARIN', a Portuguese term for the official order in China. There are nine classes of civil, and five of military mandarins, distinguished by buttons on their caps. The Chinese name for mandarin is *Kouon* (a public character). They are supposed to owe their offices entirely to merit.

MAN'DIBLE (*mandibula*, a jaw: *Lat.*), in Ornithology, the upper and under bill of birds —— Also, in Anatomy, a name for the jaw. [See MAXILLA.]

MAN'DOLINE, a musical instrument with four strings, something like a lute. It is still in use in Italy.

MAN'DRAKE (*mandragoras: Gr.*), the *Mandragora officinalis* of botanists, nat. ord. *Solanaceæ*. The forked root of this plant was thought to resemble the human form, and many superstitions were connected with it, such as the opinion that it uttered a shriek when torn out of the ground. It was used in love incantations. An acronarcotic poison resides in the juice, which was once employed in medicine, being reckoned amongst 'drowsy syrups.'

MAN'DREL, or MAN'DRIL (*mandrin: Fr.*), in Machinery, a revolving spindle, to which the turner fixes his work in the lathe.

MAN'DRILL, a baboon, the *Papio maimon* of naturalists, a native of Guinea, the largest, most brutal and ferocious of the class. It is blue-faced, and has very protuberant cheeks. The nose of the adult becomes red, and even scarlet, at the end. Its colour is a greyish brown. The male is as large as a man.

MANE'GE (a riding-school: *Fr.*), the art of breaking in and riding horses, or the place set apart for equestrian exercises. [See HORSE and HORSEMANSHIP.]

MA'NES (*Lat.*), in the pagan system of theology, a general name for the infernal deities. The ancients comprehended under the term *manes* not only Pluto, Proserpine, and Minos, but the souls of the deceased also. It was usual to erect altars and offer libations to the *manes* of deceased friends and relations; for the superstitious notion that the spirits of the departed had an important influence on the good or bad fortune of the living made people very cautious of offending them. When it was not known whether a corpse had been buried or not, a *cenotaph* was erected, and the manes were solemnly invited to rest there, from fear that otherwise they would wander about the world, terrifying the living, and seeking the body which they had once inhabited

MAN'GANESE, of a greyish-white colour, and of considerable brilliancy; it has neither taste nor smell, is of the hardness of iron, very brittle, and, when reduced to powder, is attracted by the magnet. Its spec. grav. is about 8 0. Being very difficult of fusion, it does not combine readily with many metals; but it shows considerable affinity to iron, occurring frequently combined with it in nature, and it is supposed to improve the quality of steel. Manganese is applied to no use in its metallic form. Its attraction of oxygen is so great, that exposure to the air is sufficient to render it red, brown, black, and ultimately friable, in a very short time. The black oxide (the binoxide) is used largely as a source of oxygen; mixed with oil, it takes fire of itself. It frees from colour glasses tinged with iron, and is therefore used in glass-making; it changes the iron into peroxide, and becomes itself protoxide, neither of which compounds imparts a colour; but, if added in excess, it produces an amber colour. It is also used to give a black colour to earthenware. Two of its compounds with oxygen possess acid properties, and are termed manganic and permanganic acids.

MAN'GEL-WUR'ZEL (*mangel*, defect; and *würzel*, root: *Ger.*), a species of beet much used as food for cattle, and valuable from its large size and hardy nature.

MAN'GO, the fruit of a tree, the *Mangifera indica* of botanists, nat. ord. *Anacardiaceæ*, which is a native of the East Indies, but now grows in most of the tropical regions. It is allied to the sumach, attains the height of 30 or 40 feet, and is highly productive. The fruit is kidney-shaped, of a most delicious flavour, and contains a flattened kernel enveloped in a stringy case. More than eighty varieties of mango are cultivated.

MANGOSTEEN′, the *Garcinia Mangostana* of botanists, nat. ord. *Clusiaceæ*, a tree which grows in the Straits of Malacca. The fruit is something like a small orange; it is of exquisite flavour, and particularly wholesome. The tree is elegant in its appearance, and grows to the height of about eighteen feet.

MAN′GROVE, a tree of the genus *Rhizophora*, which grows in tropical countries along the borders of the sea. Its branches are long, hang down towards the earth, and, when they have reached it, take root and produce new trunks. In this manner, immense and almost impenetrable thickets are formed, which are filled with vast numbers of crabs, aquatic birds, mosquitos, &c. The seeds are remarkable for throwing out roots, which vegetate among the branches of the trees while yet adhering to the footstalk. The soft part of the white mangrove is formed into ropes; the wood of the red mangrove is compact and heavy.

MA′NIA (*mainomai*, I rage: *Gr.*), in Medicine, a delirium unattended by fever, in which judgment and memory are impaired, and there is a particular dislike to restraint. It is either melancholy or furious. *Melancholy* mania is marked by dejection of spirits; *furious* mania, by violence, a dislike to individuals, and a repugnance to scenes before agreeable. An excess or deficiency of phosphorus in the composition of the brain has been shown to accompany madness and idiocy.

MANICHÆ′ANS, in Church History, a sect of heretics in the third century, the followers of a Persian named Manichæus, or Manes, who had been one of the Magi before he became a Christian. He attempted to combine the principles of the Magi with Christianity, and gave out that he was the Paraclete whom Christ had promised to send to his disciples. He was put to death by a king of Persia as a perverter of the true religion, i.e. that of the Magi. He taught that there are two principles, or gods, coeternal and independent of each other: the first *light*, the author of all good; the second, *darkness*, the author of all evil.

MANIFES′TO (*manifestum est*, it is evident: *Lat.*—from words with which the document usually commenced in former times), in Politics, a declaration of motives by a belligerent state, or by a general having full powers, previously to the commencement of hostilities. It is addressed to the public, and signed by the sovereign, &c., who sends it.

MA′NIOC, or **MA′NIHOT**, the Indian name of the *Jatropha Manihot*, a shrub belonging to the nat. order *Euphorbiaceæ*. The roots contain a nutritious starch, but combined with hydrocyanic acid, which, however, is easily dissipated by heat, or got rid of by washing. The crude flour or meal obtained from the root is called *cassava*. *Tapioca* is a preparation of the starch. The plant is indigenous in tropical America, and cultivated also in many parts of Asia and Africa. It grows rapidly, produces abundantly, and accommodates itself to almost any kind of soil.

MANIPULA′TION (*manus*, a hand: *Lat.*), a word signifying work done with the hands. It expresses, in pharmacy, the preparation of drugs; in chemistry, the preparation of substances for experiments; and in animal magnetism, the motion of the hands, by which the operator magnetizes those on whom he operates.

MANIP′ULUS (a handful; from *manus*, a hand: *Lat.*), in Roman Antiquity, a body of infantry, consisting of two hundred men, and constituting the third part of a cohort. It was so called from the handful of straw which was used originally as its standard.——Among physicians, the term *manipulus* signifies a handful of herbs or leaves, or so much as a man can grasp in his hand at once; which quantity is frequently denoted by the abbreviation *M* or *m*.

MAN′NA (*mano*, a gift: *Syr.*), a sweet juice or gum, which flows from many trees and plants in Syria, and also in Calabria, where it exudes from two species of the ash. Its smell is strong, and its taste rather nauseously sweet. It is incapable of producing alcohol by fermentation, is dissolved by water, and affords by distillation water, acid, oil, and ammonia. It is frequently employed in the *materia medica*, and forms a considerable article of commerce. A principle called *mannite*, a combination of carbon, hydrogen, and oxygen, crystallizing in tufts of slender colourless needles, is obtainable from manna.

MANOM′ETER, or **MAN′OSCOPE** (*manos*, rare; and *metron*, a measure, or *skopeo*, I examine: *Gr.*), an instrument used to show or measure the alterations in the rarity or density of the air. The manometer differs from the barometer in this, that the latter only serves to measure the weight of the atmosphere, or of the column of air over it; but the former indicates the density, or rather the elastic force which is considered proportional to the density.

MAN′OR (*maneo*, I abide: *Lat.*), a district subject to the jurisdiction of a court baron. In the feudal times, a grant of lands from the king carried with it a power of making laws, and holding a court of justice for the dependants of the territory. The baron might parcel out new manors, and these again might be subdivided into other manors. To put an end to this, in the reign of Edward I. it was enacted that buyers of lands should hold them by the same services, and of the same lord, as when in the hands of the seller. Hence every manor now in being must have existed at least in the time of Edward I. The union of several manors under one great baron or lord paramount, was termed an *honour*. There are said to be eighty honours in England.

MAN′SLAUGHTER, in Law, the unlawful killing a man without malice, either expressed or implied. It differs from murder, in not being malicious or deliberate; and from excusable homicide, in being done in some unlawful act. Manslaughter may be either *voluntary* or *involuntary*.

MAN'TELET (*Fr.*), in Fortification, a kind of moveable parapet, or wooden penthouse, used in a siege. Mantelets are cased with iron, and set on wheels, so as to be driven before the miners, when carrying a sap or trench towards a besieged place, to protect them from the enemy's small shot.

MAN'TIS (*mantis*, a diviner: *Gr.*), in Entomology, a genus of orthopterous insects, of which there are numerous species, distinguished by the singularity of their shape. The chief species in Europe is the *Mantis religiosa*, or *praying* mantis, so called because when sitting it holds up its two fore-legs as if in the attitude of prayer; whence vulgar superstition has held it as a sacred insect; and a popular notion has prevailed, that a child or a traveller who loses his way will be safely directed by observing the quarter to which the animal pointed, when taken into the hand. The mantis is of a predaceous disposition, living on smaller insects, which it watches for with great anxiety. It is also quarrelsome; and when several are kept with others of its own species in a state of captivity, they will attack each other with the utmost violence, till all but one are destroyed.

MANT'LING (*manteau*, a mantle: *Fr.*), in Heraldry, that appearance of flourishing, or drapery, that is represented about a coat of arms. It is supposed originally to have been the representation of a mantle, or military habit, worn by the cavaliers over their armour, to preserve it from rust.

MAN'UAL EX'ERCISE (*manualis*, belonging to the hand: *Lat.*), in the Military art, the exercise by which soldiers are taught the use of their muskets and other arms.

MAN'UFACTURE (*manus*, a hand; and *factura*, a making: *Lat.*), the operation of reducing raw materials of any kind into a form suitable for use, either by the hand or by machinery. Also any commodity made by the hand, or anything formed from the raw materials or natural productions of a country, as cloths from wool, and cotton or silk goods from cotton and silk, &c. Manufactures cannot thrive except where there is security for property, and where there is no danger of interference on the part of the government in the way of undue protection or vexatious restrictions. An abundant supply of the raw material is a great advantage to manufacture, particularly where it is of a bulky and ponderous nature. We should never have been distinguished for our manufactures in metals, unless we had possessed not only these, but an abundant supply of coal also. The favourable situation of a country and its climate have a great influence on its success in manufactures: when the heat or the cold is too great, men lose much of their energy.

MANUMIS'SION (*manumissio*, from *manumitto*, I let go from the hand: *Lat.*), among the Romans, the solemn ceremony by which a slave was emancipated, or liberated from personal bondage.

MANU'RE (*manœuvrer*, to work with the hand: *Fr.*; and hence to enrich the land), any substance, whether vegetable, animal, or mineral, mixed up with the soil, to accelerate vegetation, and increase the produce of crops; as the contents of stables and farm-yards, marl, ashes, lime, fish, salt, &c. It is intended to supply some element of vegetables which is wanting in the soil.

MAN'USCRIPTS (*manu scriptum*, written with the hand: *Lat.*), writings of any kind, on paper, parchment, or any other material. The study of ancient modes of writing is styled *Palæography* (*palaios*, old, *graphe*, writing: *Gr.*). There are many modes by which antiquarians are enabled to discover the probable date of a manuscript; and there are many manuscripts which have at the end a statement when and by whom they were written, though this is not always to be relied on. Since we have had the evidence of the manuscripts found at Herculaneum, we can decide with certainty that none of our manuscripts are older than the Christian era. It was the custom, in the middle ages, wholly to obliterate and erase writings on parchment, for the purpose of writing on the materials anew. These rewritten manuscripts were called *codices rescripti*, *rasi*, and *palimpsests* [which see]. The costliness of writing materials gave rise also to abundant abbreviation. The invention of printing put an end to the destruction of manuscripts, but not to the use of abbreviation, which continued long after, being common in Greek until within the last fifty years. Latin manuscripts prior to the age of Charlemagne (A.D. 800) are considered ancient. The *illumination* of manuscripts was common among the Romans, and flourished in these countries from the 5th to the 10th century. An attempt was made to introduce it again, at the revival of the arts, but the effort was unsuccessful. Some of the portraits and other paintings in illuminated manuscripts of great antiquity are very beautiful.

MAP (*mappa*: *Lat.*), a delineation of a country, according to a scale, in which the proportion, shape, and position of places are exactly preserved. The top is usually the north, the right hand the east, the left hand the west, and the bottom the south. When the cardinal points are otherwise arranged, a *fleur-de lis* points to the north. A terrestrial map is either *geographic*, that is, relates to land, or *hydrographic*, that is, relates to the sea—in which case it is usually called a *chart*. A map representing a small extent of country is called a *topographical* map. In maps three things are essentially requisite. 1. All places must have the same situation and distance from its great circles, as on the globe, that their parallels, longitudes, &c., may be distinctly seen. 2. Their magnitudes must be proportional to their real magnitudes on the globe. 3. All places must have the same situation, bearing, and distance, as on the earth itself. The degrees of longitude are numbered at top and bottom, and the degrees of latitude on the right and left sides.

MA'PLE, the name of several trees belonging to the genus *Acer*. The common maple is *Acer campestre*; the sycamore is *Acer pseudoplatanus*. The *Acer saccharinum*, or sugar-maple, in North America, is one of the most remarkable species. By tapping this tree early in the spring, the Americans procure a large quantity of sugar; one of an ordinary size yielding in a good season from twenty to thirty gallons of sap. It is this tree that yields the ornamental wood known as bird's eye or mottled maple. The wood of the common European maple is much used by turners; and on account of its lightness is frequently employed for musical instruments, particularly for violins.

MAR'ABOUT CRANE, the *Leptoptilos Marabou* of ornithologists, inhabits Senegal, in Africa. The head and neck are nearly naked, and there is an external pouch in front of the neck. The beautiful marabout plumes are obtained from this bird.

MARANATH'A (*Syr.*), amongst the Jews, was a form of threatening, cursing, or anathematizing, and was looked upon as the most severe denunciation they had. The word is said to signify *the Lord will come;* that is, to take vengeance.

MARAN'TA, in Botany, a genus of plants, nat. order *Marantaceæ*. The species are perennials, and among them is the *Maranta arundinacea*, or Indian arrow-root, the root of which contains the starch known by this name.

MARAS'MUS (*maraino*, I make to waste away: *Gr.*), in Medicine, an atrophy or consumption; a wasting of flesh without fever or apparent disease.

MAR'BLE (*marbre: Fr.*), in Mineralogy and Geology, the several varieties of carbonate of lime, which have more or less of a granular and crystalline texture, and capable of taking a polish.——In Sculpture, several compact or granular kinds of stone, susceptible of a fine polish. The *Pentelic* and *Parian* were the white marbles most valued by the ancients. The marble of Luna, in Etruria, was whiter than even the Parian. The quarries of Carrara, in Italy, almost supply the world with white marble.

MAR'CASITE, in Mineralogy, white iron pyrites; a sulphuret of iron.

MARCH (*Martius*, literally belonging to *Mars*, the god of war: *Lat.*), the third month of the year, according to the calendar of Numa and Julius Cæsar; but in the calendar of Romulus it stood first, as it did among ourselves until the change in the style in 1752. It is said to have been named by Romulus, in honour of his supposed father Mars.——MARCH, in Military affairs, the movement of a body of troops from one place to another; or the measured and regular pace of a soldier, according to a certain form and time.——In Music, any piece adapted to a soldier's march.

MAR'CHES (*mearc*, a border or limit: *Sax.*), borders or confines, particularly the boundaries between England and Wales, and between England and Scotland. The office of the 'lords-marchers' was originally to guard the frontiers. Several titles of honour, in this and other countries, are derived from their original possessors having been appointed governors of *marches* or frontiers.

MARCO'SIANS, a sect of heretics in the second century, so called from their leader Marcus, who represented the Deity as consisting not of a trinity but a quarternity, viz., the Ineffable, Silence, the Father, and Truth.

MAR'GARATE (next), in Chemistry, a compound of margaric acid with a base.

MARGAR'IC A'CID (*margarites*, a pearl: *Gr.*), in Chemistry, one of the solid proximate principles of fats. It has a pearly lustre, is insoluble in water, but dissolves in hot alcohol, and is deposited from it by cooling. It resembles stearic acid, but is more fusible, melting at 140° Fahr.

MARGRA'VIATE (*mark*, a frontier; and *graf*, a count: *Ger.*), the territory or jurisdiction of a *margrave*, who was originally a lord or keeper of the marches or borders. It is now a title of nobility in Germany, &c.

MAR'IGOLD, a plant of the genus *Calendula*, bearing a yellow flower. There are also several plants of other genera bearing this name; as the African marigold, of the genus *Tagetes;* corn marigold, of the genus *Chrysanthemum;* marsh marigold, of the genus *Caltha*, &c.

MARI'NE (*marinus: Lat.*), pertaining to the sea; as marine productions, &c. Also a general name for the navy of a kingdom or state; comprehending likewise all that relates to naval affairs, as the building, rigging, arming equipping, navigating, and employing ships.

MARI'NES (same *deriv.*), soldiers raised for naval service, and trained to fight both on shipboard and on land. They are clothed and armed in the same way as infantry of the line. No commissions in the corps are obtained by purchase, and the officers rise by seniority, the highest grade being colonel commandant. They are commanded by a lieutenant-general and a major general, who are naval officers, holding these additional titles.

MA'RIOTTE'S LAW, in Pneumatics, the law discovered by Boyle, but commonly attributed to Mariotte, that, 'the elasticity or pressure of gases is directly proportional to their density, and therefore inversely proportional to the space they occupy.'

MARK, ST., THE GOSPEL OF, a canonical book of the New Testament, the second in order. It is said that St. Mark wrote his gospel at Rome, whither he accompanied St. Peter, in the year of Christ 44. Tertullian, and others, pretend that St. Mark was no more than an amanuensis to St. Peter, who dictated this gospel to him; others assert that he wrote it after St. Peter's death. Nor are the learned less divided as to the language in which it was written; some affirming it to have been Greek, and others Latin. It however seems plainly intended for Christian converts from paganism, and is distinguished from the other evangelical writings by its brevity, passing over much that relates to the character of Christ as Messiah.——MARK, a money of account, or a coin. The English mark is two-thirds of a pound sterling, or 13*s.* 4*d.* The Hamburg mark is 1*s.* 4*d*

MARL (*mergel: Ger.*), a species of calcareous earth, being a mixture of carbonate of lime and clay, used in agriculture for enriching barren land. When it consists chiefly of lime, it acts like that substance; when its principal ingredient is alumina or clay, it acts partly as lime, but chiefly by altering the texture of the soil. All sandy soils are improved by it. All solid marls crumble by exposure to the atmosphere, usually in the course of a year. Beds of marl frequently contain organic remains.

MAR'LINES (*marling: Belg.*), a sea term for lines of untwisted hemp, well tarred, to keep the ends of the ropes, &c., from unravelling.——MARLINE-SPIKE, a small iron spike, used to open a rope when a sail is to be sewed to it, &c.

MAR'MALADE (*Fr.*; from *marmelo*, a quince: *Portug.*), the pulp of quinces boiled into a consistence with sugar; or a confection of plums, apricots, quinces, and other fruits, boiled with sugar.

MAR'MOSETS, a family of small monkeys peculiar to tropical America. In their manner of climbing they are more like squirrels than monkeys. ['The nails, except those of the hind thumbs, are long and claw-shaped, like those of squirrels, and the thumbs of the fore extremities are not opposable to the other fingers. They have two molar teeth less in each jaw than the *Cebidæ*, the other family of American monkeys. The body is long and slender, clothed with soft hairs; and the tail, which is nearly twice the length of the trunk, is not prehensile.'—H. W. BATES.] The countenance is mobile, expressive, and intelligent. In captivity the eyes are full of curiosity and mistrust, and observe every movement of those near them. They are fed both on fruits and insects. In some species the fur is marked with bars; others carry manes. The marmosets are great favourites with the ladies of Brazil. Of one, a timid sensitive thing, seven inches long, we are told that its owner constantly carried it in her bosom, and fed it from her mouth. Although it allowed its mistress to fondle it freely, it shrank back nervously on the approach of a stranger, the whole body trembling with fear, whilst through chattering teeth it uttered its twittering notes of alarm.

MAR'MOT (*marmotte: Fr.*), the *Arctomys alpinus* of zoologists, a rodent animal, about the size of a rabbit, inhabiting the higher region of the Alps and Pyrenees. When these animals (which live in societies) are eating, they post a sentinel, who gives a shrill whistle on the approach of any danger, and they all retire into their burrows, which are well lined with moss and hay. In these retreats they remain, in a torpid state, from the autumn till April. The *prairie dog* of North America belongs to the same genus.

MA'RONITES, a sect of Christians dwelling in the neighbourhood of Mount Lebanon, and so called from Maro, their first bishop, in the seventh century. They embraced the doctrine of Monotheletism (that although there were two natures, there was but one will in Christ), but they became reconciled to the church of Rome in the twelfth century. They are nominally under the Pope's supremacy, but the priests elect their own spiritual chiefs, and they are at liberty to marry. There is a college at Rome for the gratuitous education of young Maronites.

MAROO'NS (hog-hunters: *Span. Amer.*), the name given to revolted negroes in the West Indies and in some parts of South America. In many cases, by taking to the forests and mountains, they have rendered themselves formidable to the colonies, and sustained a long and brave resistance against the white population.

MARQUE, LETTER OF, a power granted by a state to its subjects, to make reprisals on the subjects of a state with which it is at war.

MAR'QUIS, or MAR'QUESS (*mark*, a frontier: *Ger.*), a title of honour, next in dignity to that of duke, first given to those who commanded the marches, or borders and frontiers of a kingdom. Marquises were not known in England till Richard II., in the year 1387, created Robert De Vere marquis of Dublin. The wife of a marquis is styled a *marchioness*. The marquis's coronet is a circle of gold set round with four strawberry leaves, alternating with as many pearls on pyramidal points of equal height.

MAR'RIAGE (*mariage: Fr.*). With the most ancient inhabitants of the East the bride was obtained by presents made, or services rendered, to her parents; and to this day the same practice prevails among the Circassians and the poorer Turks and Chinese. Both men and women, among the Athenians, cut off their hair before marriage, and consecrated it to some god or goddess, under whose protection they had more immediately placed themselves; and all virgins, before they could enter upon that state, were consecrated to Diana. Previous to the actual marriage of the parties contracted, sacrifices were offered up, and the gall of the victim was always thrown behind the altar, intimating that anger and malice should have no admission. Among the Romans there was no particular age determined for marriage, but all espousals were to be consummated by the nuptials within two years. The man always, at the time of entering into contract, sent a plain iron ring to the woman as a pledge of affection.——LAW OF MARRIAGE. Parties may, as they please, be married either by the superintendent-registrar or in a place of worship licensed for the purpose. They may be married after the publication of banns, or without them by special or ordinary license, or by the superintendent-registrar's certificate with or without license. If the marriage is solemnized at the office of the superintendent-registrar it must take place in his presence and that of some registrar of the district, and two other witnesses, with open doors, between the hours of eight and twelve in the forenoon. Marriages in Ireland and Scotland are valid if made in the form required in those countries. Marriages are void if contracted within the prohibited degrees, or where there is a prior existing marriage, and in cases of lunacy or incapacity. It is dissolved by the divorce court on proof of adultery. [See ADULTERY.] Bigamy or polygamy is a felonious offence. A wife committing any felony, except murder or manslaughter, in company with her husband, is not responsible for it; but she is, in such circumstances, indictable for high treason. In neither civil nor criminal cases, with the exception of treason, are husband and wife allowed, in ordinary circumstances, to give evidence against each other. Should the husband die intestate, the wife is entitled to half his personal property if there is no issue; if there is, to one-third. The husband is liable for all debts contracted by the wife before marriage, except those incurred during a former marriage; but his responsibility is ended by his or her death. He is not liable for debts incurred by her during marriage, unless they are contracted with his consent, either expressed or implied. He is not liable for his wife's debts, even for necessaries, if he turn her away for adultery, if she abandon him, or if they separate by mutual agreement. The will of a bachelor, or a widower not having children, is revoked by subsequent marriage and birth of issue. The warrant of attorney, given to an unmarried woman, is revoked by her marriage; also her will.

MARS (in Mythology, the god of war), in Astronomy, one of the superior planets, moving round the sun in an orbit between those of the earth and Jupiter. His mean distance from the sun is about 142,000,000 miles. He performs his mean sidereal revolution in very nearly 687 days. At the beginning of this century his orbit was inclined to the ecliptic at an angle of 1° 51′ 6″. His diameter is about 4100 miles. He revolves on his axis in 24h. 39m. 21s. The outlines of continents and seas may be distinctly discerned on his surface. His reddish colour is most probably due to an ochreous soil, and his seas, by contrast, appear green. [See COLOURS, ACCIDENTAL.] His poles seem very white, no doubt from snow, as the whiteness is greatest after the long polar winter, and it disappears after long exposure to the sun.

MARSH (*marécage: Fr.*), a tract of low land, usually or occasionally covered with water; or very wet and miry, and overgrown with coarse grass and sedges. Land occasionally overflowed by the tides is called a *salt marsh*.

MARSH-MAL'LOW. [See ALTHÆA.]

MAR'SHAL (*maréchal: Fr.*), in its primary signification, means an officer who has the charge of horses; but it is now applied to officers who have very different employments.——MARSHAL OF THE QUEEN'S BENCH, an officer who had the charge of the prison formerly in Southwark; but his office has been abolished, that of *Keeper of the Queen's Prison* having been substituted for it.——EARL-MARSHAL, the eighth officer of state; an honorary title, and personal until made hereditary by Charles II. in the family of Howard. He is at the head of the college of Heralds.——FIELD-MARSHAL, a military officer of the highest rank.——In the United States of America, a *marshal* is a civil officer, appointed by the president and senate, in each judicial district; answering to the sheriff of a county in England.——MARSHAL OF FRANCE, the highest military rank in the French army. It first appears in the reign of Philip Augustus: it ceased after the deposition of Louis XVI., and was revived by Napoleon.

MAR'SHALLING (last), in Heraldry, the arranging of several coats of arms belonging to distinct families in one escutcheon or shield, together with their ornaments.

MAR'SHALSEA (*maréchaussée: Fr.*), formerly a prison in Southwark. The Queen's Bench, Fleet, and Marshalsea prisons, used for the confinement of debtors and criminals, by authority of the superior courts at Westminster, the High Court of Admiralty, &c., are now consolidated into one. ——MARSHALSEA, a court instituted to hear causes between the king's household and others, and having jurisdiction twelve miles round Whitehall; but now abolished.

MARSU'PIALS (*marsupion*, a purse: *Gr.*), an order of mammals, including the KANGAROOS of Australia and the OPOSSUMS of America. They must be placed near the base of the mammalian scale, and show in their structure various points of connection with reptiles. One of the most remarkable parts of their structure is the possession of an external pouch, which serves as a lodgment for the young, that are always prematurely born. They vary greatly in their habits and food.

MARTEL'LO TOW'ERS, a number of towers erected along different parts of the coasts of Great Britain and Ireland, as a defence against the threatened invasion of France by Napoleon Buonaparte. They are circular, with very thick walls, and bomb-proof roofs. One traversing gun was mounted on each, in working which the men were protected by a lofty parapet. They derived their name from the fact that the Italians, in past ages, built towers on their coasts, where they gave warning of the approach of pirates by striking a bell with a hammer, whence such towers were styled *Torri de Martello.* They have for some time served as stations for the use of the coast-blockade force.

MAR'TEN (*martes: Lat.*), the *Martes Foina*, an animal of the weasel tribe; one of the prettiest of the beasts of prey which are found in Great Britain. It has a small head, an agile body, and lively eyes. These animals are very destructive to poultry, eggs, &c.; they also feed on rats, mice, moles, and sometimes on grain. The pine marten (*Martes abietum*) inhabits the woods of North America and Europe, and is much esteemed for its fur, which is used for trimmings. About 100,000 skins of this animal are said to be annually collected in the fur countries.

MAR'TIN. [See HIRUNDO.]

MAR'TINETS (*Fr.*), in a ship, small lines fastened to the leech of a sail, reeved through a block on the topmast head, and coming down by the mast to the deck. Their use is to bring the leech of the sail close to the yard for the purpose of being furled.——In Military language, a *martinet* signifies a strict disciplinarian.

MAR'TINGALE (*Fr.*), in the manège, a

thong of leather fastened at one end of the girths under the belly of the horse, and at the other end to the musrol, passing between the fore legs: it is intended to keep him from rearing.——Also, a sea term for a rope extending from the jib-boom to the end of the bumpkin.

MART'LETS, in Heraldry, little birds, like swallows, but with short tufts of feathers instead of legs. It is the difference or distinction of a fourth son.

MAR'TYR (*martūs*, literally a witness: *Gr*.), any innocent person who suffers death in defence of a cause rather than abandon it. In the Christian sense of the word, it is one who lays down his life for the Gospel, or suffers death for the sake of his religion. Those who boldly asserted their belief, but were not visited with the extreme punishment of death, were termed *confessors*.

MARTYROL'OGY (*martūs*, a martyr; and *logos*, a description: *Gr*.), a catalogue or list of martyrs, including the history of their lives and sufferings. Many of the ancient martyrologies, like those used at present in conventual establishments, were filled with fictions.

MAR'VEL of PERU, the popular name of a Mexican plant, the *Mirabilis dichotoma* of botanists, nat. ord. *Nyctaginaceæ*. It has handsome flowers which show a great tendency to sport as to colour.

MA'SONRY (*maçonnerie: Fr.*), that branch of the building art which consists in hewing or squaring stones, &c., and in properly laying them. Several kinds of masonry were in use among the ancients:—the *reticulatum* (*rete*, a net: *Lat.*), arranged in diagonal courses like the meshes of a net; the *incertum* (*incertus*, irregular), in which the stones of the same course were not required to be of the same height, nor the joints, though flat, perpendicular; the *isodomus* (*isos*, equal; and *domos*, a collection of building materials: *Gr.*), in which the courses were equal in height; the *pseudisodomus* (*pseudēs*, false: *Gr.*), in which the courses were of unequal height; the *emplectum* (*empleko*, I interweave: *Gr.*), in which the faces were wrought, the centre being filled up with rubble; *diatoni* (*dia*, through; and *teino*, I stretch: *Gr.*), or bond stones, being used by the Greeks with this kind of work. It is highly important, in every kind of masonry, that the vertical joint of one course should not fall on or very near that of the course under it.

MA'SONS (*maçons: Fr.*), or **FREE AND ACCEPTED MASONS**, a term applied to a fraternity of great antiquity, and so called probably because the first founders of it were persons of that occupation. It is generally understood that they are bound by an oath of secrecy not to reveal anything that passes within the society, and the members throughout the world are known to each other by certain secret signs. It professes to be founded on the practice of social and moral virtue, and inculcates 'brotherly love, relief, and truth.' [See FREEMASONRY.]

MASQUE, a theatrical drama, or gorgeous histrionic spectacle, much admired at the courts of princes during the 16th and 17th centuries. According to Holinshed's Chronicle, the first masque performed in England was at Greenwich, in 1512. Shakspeare, as well as Beaumont and Fletcher, have frequently introduced masques into their plays. James I. carried the glory of the masque to its height. It had before consisted of music, dancing, gaming, a banquet, and a display of grotesque personages and fantastic dresses; but it now assumed a higher character.——In Architecture, certain pieces of sculpture representing hideous forms, which serve to fill up vacant spaces.

MASQUERA'DE (*mascherata: Ital.*), an exhibition, in which persons wearing masks meet together and represent different characters.

MASS, in the Church of Rome, the prayers and ceremonies used at the celebration of the eucharist; or, in other words, at the supposed consecrating of the bread and wine into the body and blood of Christ, and offering them, so transubstantiated, as an expiatory sacrifice for the living and the dead. It derives its name from the words '*ite, missa est concio*' (go, the assembly is dismissed: *Lat.*), of which the words '*ite, missa est*' are still retained, being pronounced at its close. It was arranged in its present form by Gregory I., in the 6th century. *Low masses* are those in which only one person officiates. In *high masses*, the officiating priest is assisted by the deacon, subdeacon, &c.; the ceremonies are more numerous, and it is accompanied with music. The masses of the religious orders usually differ more or less from those of the secular clergy. Masses said in certain places, or by certain persons, have *indulgences* attached to them by grant from the pope, and are therefore deemed more efficacious; they are applicable, generally speaking, to both the living and the dead.——**MASS** (*masse: Ger.*), the quantity of matter in any body; its amount is obtained by multiplying the volume into the density. The mass multiplied by the constant force of gravity constitutes *weight*.——In the Fine Arts, a large quantity of light or shade.

MASSE'TER (*massētēr*, from *masaomai*, I chew: *Gr.*), a short thick muscle, which raises the lower jaw, and aids in moving it backwards and forwards, in the act of chewing.

MAS'SICOT, the yellow oxide of lead. It is prepared by calcination of white lead, the carbonate of the metal: by further calcination, it becomes *minium*, or red lead.

MAS'SIVE (*massif: Fr.*), in Mineralogy, having a crystalline structure, but not a regular form.——Among builders, an epithet given to whatever is particularly heavy and solid: thus a massive column is one too short and thick for the order whose capital it bears, &c.

MASSO'RA, or **MASO'RA** (tradition: *Heb.*), a critical work amongst the Jews, containing remarks on the verses, words, letters, and vowel-points of the Hebrew text of the Bible. The Jewish Rabbis or doctors who drew it up were called *Massorites*. Before their time, the sacred books had no breaks or divisions into chapters or verses; and in consequence of the errors which had crept in during the Babylonish captivity, it was found necessary to ascertain and fix the reading of the Hebrew text; which they did, and also divided the canonical books into twenty-two, and these twenty-two books into chapters, and the chapters into verses.

MAST (*Ger.*), a long, upright piece of timber, raised from the keel, through the deck of a vessel, to which the yards, sails, &c., are fixed; the whole being supported by an ingenious combination of ropes, adapted to be used as a means of ascent for the purpose of adjusting the sails. The *mainmast* is the largest mast in the ship, and in large ships is divided into lower, top, top-gallant, and royal, the *foremast* is the next in size, standing near the stem of the ship; the *mizenmast*, the smallest of the three, stands between the mainmast and the stern.——**Mast**, the fruit of the oak and beech.

MAS'TER (*maître: Fr.; from magister: Lat.*), in Law, the name of several officers who preside in their various departments. ——**Master at-arms**, in a ship of war, he who has charge of the small arms, and exercises the petty officers, &c.——**Master of Arts**, the second degree taken at Cambridge and Oxford, to which candidates are not admitted until they are of seven years' standing. In the foreign and Scotch universities it is the first degree ——**Master of the Ceremonies**, an officer attached to all European courts, whose duty is to regulate matters of state ceremony and etiquette. ——**Masters in Chancery**, assistants to the lord chancellor and master of the rolls. There were, including the master of the rolls and accountant general, twelve masters in *ordinary*, of whom the master of the rolls was chief. They are now abolished, with a reservation of the rights, duties, and privileges of the accountant-general as one of them. Masters *extraordinary* were appointed to act in the country, beyond twenty miles from London ——**Master of the Horse**, an officer of the crown, who has the charge of the royal stud, and is over the equerries and other officers attached to that part of the regal establishment.——**Master of the Rolls**, a patent officer, who has the custody of the rolls of parliament, patents which pass the great seal, the records of chancery, commissions, deeds, &c. He hears causes in the Rolls-chapel.——**Master**, in a merchant-vessel, the same as captain; but in a ship of war an officer who inspects the provisions and stores, takes care of the rigging and ballast, and navigates the ship under the directions of his superior officer. ——**Master of the Wardrobe**, an officer under the lord chamberlain, who has the care of the royal robes.

MAS'TIC, or **MAS'TICH** (*mastikē: Gr.*), a solid and transparent resin, of a pale yellow or whitish colour, principally brought from the island of Chios, in drops or tears, the form in which it naturally exudes from the *Pistacia atlantica* and *P. lentiscus*, two trees belonging to the nat. ord. *Anacardiaceæ*. It is used for strengthening the gums and sweetening the breath.——In Architecture, a species of cement used for plastering walls. It contains a large quantity of linseed-oil, and becomes hard in a few days.

MAS'TIFF (*mæst*, greatness; and *tæve*, a dog: *Goth.*), in Zoology, the *Canis Molossus*, having a large head, with pendent lips and ears, and distinguished by vigilance, strength, and courage. English mastiffs were held in such high estimation at ancient Rome, that an officer was appointed for the purpose of breeding them, and sending to the imperial city such as he thought capable of sustaining the combats in the amphitheatre.

MAS'TODON (*mastos*, the breast; and *odous*, a tooth: *Gr.*), in Natural History, a genus of mammiferous animals resembling the elephant and mammoth, but found only in a fossil state. There are no traces, within the period of tradition or history, of their existence. They derive their name from the conical projections on the surfaces of their molar teeth.

MAS'TOID (*mastos*, a breast; and *eidos*, form. *Gr.*), in Anatomy, an epithet for those processes of bone which resemble the nipple of a breast.

MASTOL'OGY (*mastos*, a breast; and *logos*, a description. *Gr.*), that branch of zoology which treats of mammiferous animals.

MATE (*maet: Dut.*), an officer who is assistant to the captain of a merchant-vessel on shipboard. Large ships have a first, second, and third mate. In ships of war, the master has *mates* selected from the midshipmen; the boatswain, carpenter, gunner, &c., have each their mates.

MATE'RIALISM (*materia*, matter: *Lat.*), the doctrine held by those who maintain that man does not possess a spiritual part distinct from his body, and hold that what others call soul or spirit is only the result or effect of the organization of matter in the body.

MATE'RIA MED'ICA (medical stuff: *Lat.*), a term used to denote all those substances which are employed in the prevention of diseases and the restoration of health.

MATHEMAT'ICS (*mathēmatikē*, from *mathein*, to learn. *Gr.*), the science which has for its object the indirect measurement of magnitudes. It proposes to determine magnitudes by each other according to the precise relations that exist between them. Mathematics are to be regarded less as a constituent part of natural philosophy than as having become the true basis of the whole of natural philosophy; though, strictly speaking, they are both. The science is of less value for the knowledge of which it consists, important as that knowledge is, than as being the most potent instrument that the human mind can employ for investigating the laws of natural phenomena. It is divisible into two great sciences: Abstract mathematics, or the calculus in its most extensive sense; and Concrete mathematics, which are composed of general geometry and rational mechanics. The concrete part is founded upon the abstract, which, in its turn, becomes the basis of all natural philosophy. It is the business of concrete mathematics to discover the equations of phenomena. Hence it depends on the character of the objects examined, and varies with the phenomena. The process is therefore special, and its character experimental, physical, phenomenal. Abstract mathematics, on the other hand, are entirely independent of the nature of the objects, and are concerned only with their numerical relations. Their process is general; their character purely logical and rational. They are an immense extension of logic to a certain order of deductions; and it reaches from the simplest numerical operations to the highest combinations of transcendental analysis. The object is to discover unknown quantities by the known, using, as its starting point, that which is the limit of concrete mathematics; the knowledge of the precise relations, that is, the equations between different magnitudes which are considered simultaneously. If all phenomena were capable of being reduced to questions of numbers, the whole domain of natural science would be brought within the reach of mathematics; but such is the increasing complexity of phenomena, as they become special, and such the narrowness of human capacity, that the difficulty of discovering suitable equations, except in the case of the simplest and most general phenomena, is insurmountable. [See ALGEBRA.]

MAT'INS (*matin*, the morning: *Fr.*), the first part of the daily service, particularly in the Roman Catholic church, in which it, as well as lauds, may be said the afternoon preceding the day to which it belongs.

MAT'RASS (*matras: Fr.*), or CUCURBIT, a long straight-necked chemical glass vessel used for digestion and distillation; being sometimes bellied, and sometimes gradually tapering into a conical figure. The matrass is superseded in a modern chemistry by the flask. *Florence flasks*, in which sweet oil is imported, are, on account of their thinness (which renders them not likely to break when heated) and their cheapness, extremely convenient in chemical processes on a small scale.

MATRICULA'TION (*matricula*, the *dim.* of *matrix*, a public register: *Lat.*), the act of admitting any person to be a member of an English university.

MA'TRIX (the womb: *Lat.*), in Metallurgy, the bed or mould of earth, &c., in which any mineral substance is found. It is called also a *gangue*. A mould, or whatever gives form to anything; as, in Printing, the mould or form in which the type or letter is cast.——In Coining, the steel die, on which are engraved the figures, arms, &c., with which the coin is to be stamped.

MATROSS', one of those who, in a train of artillery, were next to the gunners, and assisted them in loading, firing, and sponging the guns. They carried firelocks, and marched with the store waggons as guards and assistants.

MAT'TER (*materies: Lat.*), that which is the object of our senses; we can never know more than its *sensible properties*. It does not necessarily come under the cognisance of *all* our senses: thus we cannot see the colourless gases. Its essential properties are, *divisibility*, or the capability of being separated into parts; *impenetrability*, the impossibility of two different quantities of matter occupying the same place at the same time; *porosity*, the separation of its particles by small pores or empty spaces; *compressibility*, a capability of being made to occupy a smaller space—the consequence of porosity; *extension*, the occupation of some definite portion of space; *mobility*, the capability of being moved from one place to another; and *weight*, or the mutual attraction existing between every one of its particles and the earth—a consequence of that great law by which every portion of matter attracts every other, at least within certain very great distances, that attraction being inversely as the square of the distance. Matter is usually divided by philosophical writers into three kinds or classes—solid, liquid, and aeriform. *Solid* substances are those whose parts firmly cohere or resist compression, as wood or stone. *Liquids* are those which have free motion among their parts, and yield to any force, as water, wine, &c. *Aeriform* substances are elastic fluids, called vapours and gases, as air, oxygen, &c.

MATTH'EW, ST., GOSPEL OF, a canonical book of the New Testament. St. Matthew is generally thought to have composed his gospel in Judæa, at the request of those he had converted; and it is thought he began it in the year 41, eight years after Christ's resurrection. It was written, according to the testimony of all the ancients, in the Hebrew or Syriac language, which was then common in Judæa; but the Greek version of it, which now passes for the original, is as old as the apostolical times.

MAT'URANT (*maturo*, I ripen: *Lat.*), in Pharmacy, a medicine or application which promotes suppuration.

MAUL'STICK (*mahlstock*, from *mahlen*, to paint: *Ger.*), a painter's stick, on which he rests his hand when he paints.

MAUN'DAY THURS'DAY, the Thursday in Passion week, or that which is next before Good Friday. The word is supposed by some to be derived from the Saxon *maund*, a basket, because on that day princes used to give alms to the poor from baskets. Others think it was called *Maunday* or *Mandate* Thursday, from *mandatum* (a command: *Lat.*), on account of the command which Christ gave his disciples to commemorate him in the Lord's supper, which he this day instituted; or from the new commandment that he gave them to love one another, after he had washed their feet as a token of his love towards them.

MAUSOLE'UM, a general designation for any superb and magnificent monument of the dead, adorned with rich sculpture, and inscribed with an epitaph. In a more confined acceptation, it expresses a pompous monument in honour of some emperor, prince, or very illustrious personage; but it properly and literally signifies that particular monument constructed out of the native rock by Artemisia to the memory of her husband Mausolus, king of Caria, whence it derives its name. This monument was so superb that it was reckoned one of the wonders of the world. It was formed, B.C. 353, at Halicarnassus, in Asia Minor. Its pyramid of 24 steps was crowned by a marble chariot, and 36 columns were placed around it. The base formed a parallelogram that measured 472 feet. Five sculptors of the highest eminence were employed to enrich it with statuary and carvings. Some of the sculptures are now in the British Museum.

MAX'ILLARY BONES (*maxilla* a jawbone, *Lat.*), in human anatomy, the bones in which the teeth are lodged. In the adult the upper jaw is formed of one bone, but it consists of several elements in children; and in monkeys and other quadrupeds one of these elements remains permanently distinct. The lower jaw in the infant consists of two branches joined at the middle, but in the adult it is composed of a single bone. The animal visage is distinguished from man's by the elongation of the jaw-bones. [See FACIAL ANGLE.] In fishes the upper jaw is sometimes wanting, as in the eels; it is occasionally formed by a single pair of bones, but often by two pairs of bones, called the maxillary and premaxillary bones. The lower jaw is called the mandible. Amongst insects, the term *maxillæ* is applied to the hinder or inferior pair of jaws; each carries a jointed organ called a *palpus*.

MAX'IM (*maxime: Fr.*), an established proposition or principle; in which sense, according to popular usage, it denotes nearly the same as *axiom* in philosophy and mathematics. Maxims are self-evident propositions, and the principles of all science; for on these, and definitions, all demonstrative knowledge depends.

MAX'IMA and **MIN'IMA** (the largest and smallest quantities: *Lat.*), terms used in analysis to signify, not the greatest and least values of a variable quantity, but the values it has at the instant when it ceases to increase and begins to decrease, and *vice versâ*. A variable, therefore, may have several maxima and minima.

MAY, the fifth month in the year, reckoning from January; and the third, beginning with March, as was the practice of the ancient Romans, &c. This month derives its name from Maia, the mother of Mercury, to whom sacrifice was offered on the first day of it. The month of May is, in the Roman Catholic church, specially devoted to the Virgin; and many Roman Catholics even term it, in the ordinary business of life, the *month of Mary*.

MAY'-FLY, a name given to several insects, but most correctly to the *Ephemera vulgata*, a neuropterous insect, plentiful in the beginning of summer, and used as a bait in fishing, especially for trout.

MAY'OR (*major*, greater: *Lat.*), the chief magistrate of a city or municipal borough, who, in London, Dublin, and York, is called lord mayor. [See COMMON COUNCIL.]

MEAD (*meth: Ger.*), an agreeable sweet kind of wine, made of honey and water, boiled and fermented.

MEAD'OW, in its general signification, means pasture or grass-land, annually mown for hay; but the term is more particularly applied to lands that are too moist for cattle to graze upon in winter without spoiling the sward. In America, the word *meadow* is applied particularly to the low ground on the banks of rivers, consisting of a rich mould or an alluvial soil, whether grass-land, pasture, tillage, or woodland.

MEAD'OW-ORE, in Mineralogy, conchoidal bog-iron-ore.

MEAD'OW-SWEET, in Botany, a plant of the nat. ord. *Rosaceæ*, and genus *Spiræa*, with crumpled leaves, something like those of the elm, growing in meadows. Its flowers are white and fragrant.——**MEADOW-RUE**, a plant of the nat. ord. *Ranunculaceæ*, and genus *Thalictrum*.——**MEADOW-SAFFRON**, a plant of the nat. ord. *Melanthaceæ* and genus *Colchicum*.——**MEADOW-SAXIFRAGE**, a plant of the nat. ord. *Umbelliferæ*, and genus *Peucedanum*.

MEAN (*medianus*, middle: *Lat.*), a middle state; called *arithmetical* when it is half the sum of two extremes; *geometrical*, when it is the square root of the product of two extremes; and *harmonical*, when it is equal to twice the product of the extremes divided by their sum.——*Mean distance of a planet from the sun*, in Astronomy, a right line drawn from the sun to the extremity of the conjugate axis of the ellipsis in which the planet moves; and this is equal to the semi-transverse axis. It is so called because it is a mean between the planet's greatest and least distance from the sun.——*Mean motion*, that by which a planet is supposed to uniformly traverse its orbit, and which is always proportional to the time.——*Mean time*, or *equal time*, that which is measured by an equable motion, as that of a clock.

ME'ASLES (*maselen: Teut.*), in Medicine, *Rubeola*, a well-known disease. Persons of all ages are liable to its attacks; but it is more common in young children, and rarely affects an individual a second time. The symptoms are a swelling and inflammation of the eyes, hoarseness, cough, drowsiness, and, about the fourth day, an eruption of small red spots. Even when violent, the measles are not necessarily of a putrid tendency, although such a disposition sometimes prevails.

MEAS'URE (*mesure: Fr.*; from *mensura: Lat.*), any given quantity, by which, as a *unit*, the length, breadth, thickness, and capacity of other things may be estimated, or proportioned, for the convenience and regulation of trade and commerce. Formerly, every province, and almost every place of importance, had its own measures, which proved a most perplexing hindrance to commercial intercourse. In modern times many attempts at uniformity were made in the United Kingdom; and at length, by an act of parliament, which came into operation Jan. 1, 1826, the London measures and weights were declared to be the standards for measures and weights throughout the realm. They are founded on the *standard yard*, which was declared by law to bear the same proportion to the length of a pendulum vibrating seconds of mean time, in the latitude of London, in a vacuum at the level of the sea, as 36 inches bear to 39·1393 inches; so that, if lost or injured, it might be easily replaced. This standard has since been lost, having been destroyed by the fire which consumed the two houses of parliament, in 1834. It is highly desirable that a decimal system of measures, as well as weights, should be adopted amongst us, on account of the facility with which calculations are made under that system.——MEASURE, in Arithmetic, &c., a quantity contained in another some number of times, without a remainder: thus, 7 is a measure of 21.——MEASURE, in Music, the interval which the person who beats time takes between the rising and falling of his hand, in order to render the movement quicker or slower, according to the nature of the subject.——MEASURE, in Poetry, a certain number of syllables metrically arranged.

MECHAN'ICS (*mēchanē*, a machine; from *mēchos*, an expedient: *Gr.*), that branch of practical science which treats of the effects of powers or motive forces, and their action on bodies, either directly or by means of machines and engines. The term *mechanics* includes *statics*, or the laws which relate to bodies in equilibrium; and *dynamics*, or those which relate to bodies in motion. When the bodies under consideration are in the fluid state, the term *hydromechanics* might be employed, which would include *hydrostatics*, or the laws relating to fluids at rest; and *hydrodynamics*, or the laws relating to fluids in motion, with *hydraulics*, or the laws which govern machinery moved by water. The terms *aerostatics* and *aerodynamics* have been used to indicate those branches of science which relate to elastic fluids at rest, and in motion; and they likewise ought to be included under the general term *aeromechanics*.——The *mechanical powers* are six simple machines, to which all others, how complex soever, may be reduced, and of which, or their combinations, all others are composed. These are the *lever*, the *pulley*, and the *wheel and axle*, all reducible to the *lever*; the *inclined plane*, the *wedge*, and the *screw*, all reducible to the *inclined plane*. The forces which may be employed to give motion to machines are called *mechanical agents*, or *prime movers*. They are water, wind, steam, gunpowder, the strength of man and other animals, &c. *Water* acts by its weight, and by the velocity which it acquires from falling in consequence of its weight. *Wind* acts by its volume or mass and its velocity. Both these agents are variable, and both act in a straight line. *Heat*, as given out by combustible materials, produces steam, or gives motion to air by making it lighter, and causing it to expand. *Steam*, as usually employed, generates a motion, which is alternately in one direction and the opposite. The *strength of animals* is commonly made to act upon some point of resistance, by drawing, pushing, or pressing; and produces variable motions, naturally in a straight line, but sometimes in a curve.

MECHO'ACAN (from that province of Mexico whence it is brought), *white jalap*, the root of the *Convolvulus Mechoacanna*. It is a purgative, and was formerly used for jalap.

MECON'IC A'CID (*mēkōn*, the poppy: *Gr.*), the acid with which morphia is combined in opinion. When pure, it is in small white crystals. Its salts are termed *meconates*.

MED'AL (*médaille*: *Fr.*), a piece of metal in the form of a coin, intended to convey to posterity the portrait of some great personage, or the memory of some illustrious action. Ancient coins, though, strictly speaking, not medals, are included under the term. The parts of a medal are the two sides, one of which is called the face, or *obverse*, containing the head, and the other the *reverse*. On each side is the area, or field, which forms the middle of the medal; the rim, or border; and the *exergue*, or plain circular space just within the edge; and on the two sides are the type, or the figure represented, and the legend, or inscription. Egyptian medals are the most ancient; but the Grecian far excel all others in design, force, and delicacy. Those of the Romans are beautiful, the engraving fine, the invention simple, and the taste exquisite They are distinguished into consular and imperial: the *consular* medals are the most ancient, but those of copper and silver do not go farther back than the 485th year of Rome, and those of gold no farther back than the year 546. [See MONEY.] Among the *imperial* medals, a distinction is made between those of the upper and lower empire. The first commenced under Julius Cæsar, and continued till A.D. 260; the lower empire includes a space of nearly 1200 years, and ends with the taking of Constantinople. The use of medals is very considerable; they often throw great light on history, in confirming such passages as are true in old authors, in reconciling such as are discrepant, and in recording such as have been omitted. In this case, a cabinet of medals may be said to be a body of history. It was, indeed, an excellent way to perpetuate the memory of great actions, thus to coin out the life of an emperor, and to put every exploit into the mint—a kind of printing before the art was invented. Nor are medals of less use in architecture, painting, poetry, &c.; for a cabinet of medals is a collection of pictures in miniature, and by them the plans of many of the most important buildings of antiquity are preserved.——*Impressions of medals.* The following is a very easy method of taking the impressions of medals and coins. Melt a little isinglass-glue with brandy, and pour it thinly over the medal, &c., so as to cover its whole surface; let it remain on for a day or two till it is thoroughly dry and hardened, when it may be easily removed, and will afford an excellent impression.

MEDAL'LION (*Fr.*), a medal of an unusual size, supposed, in ancient times, to have been struck by the emperors for their friends, and for foreign princes and ambassadors.

MED'ICINE (*médecine*: *Fr.*; from

cina: Lat.), the art which treats of the means of preserving or restoring health. It is founded on the study of man's physical and moral nature, in health and in disease. It has struggled at all times, and continues to struggle, with favourite theories; and has, with the slowness which marks all important advances in human knowledge, but lately emerged from some of the prejudices of many ages, and will doubtless long continue subject to others. Hippocrates, who lived about the middle of the fifth century before the Christian era, is the earliest author on medicine whose writings have been preserved. He was a man of very superior medical acquirements, and, by the consent of posterity, he has been styled the Father of Medicine. Two other lights of ancient medicine were Celsus, who wrote in Latin in the first century after Christ, and Galen, who practised at Rome, but wrote in Greek, his native language, in the second century of our era.

MEDI'ETAS LIN'GUÆ (a moiety of the stranger's tongue: *Lat.*), in Law, a jury consisting of half natives and half foreigners, which is empannelled in cases of felony or misdemeanour, where the party to be tried is a foreigner.

ME'DIUM (*Lat.*), in Philosophy, the space or region through which a body in motion passes to any point. Thus, air is the medium in which bodies move near our earth; water, that in which fishes live and move; and we likewise speak of a resisting medium, a refracting medium, &c.——MEDIUM also denotes the means or instrument by which anything is accomplished, conveyed, or carried on. Thus money is the *medium* of commerce; bills of credit or bank-notes are often used as media of trade in the place of gold and silver; and intelligence is communicated through the medium of the press.

MED'LAR (*mæd*, mead: *Sax.*—from its fruit being used in that liquor), the fruit of the *Mespilus Germanica*, a plant cultivated in our gardens for its fruit, which, before it is perfectly ripe, has an extremely sharp and astringent taste. Medlars do not ripen on the tree, but are gathered in autumn, and kept till they approach a state of decomposition, before they are considered fit to be eaten.

MEDUL'LA (*Lat.*), in Anatomy, the marrow, a soft oleaginous substance contained in the cavity of the bones. Anatomists, for many ages, took it to be a mere shapeless and irregular mass of matter; but it is found in reality to consist of a number of fatty substances, contained in minute vesicles of a membranaceous structure, in which it is secreted from the arterial blood, in the same manner as the fat of the rest of the body.——MEDULLA CEREBRI, or medullary substance, the interior white portion of the brain.——MEDULLA OBLONGATA, the lower and medullary part of the cerebrum and cerebellum; it extends to the great foramen or hole in the occipital bone of the cranium, where it gives origin to the spinal marrow and to the nerves of the brain.——MEDULLA SPINALIS, the spinal marrow, a continuation of the medulla oblongata of the brain It is enclosed in a kind of bony canal, formed by the vertebræ, and in this is continued from the head to the extremity of the os sacrum.——MEDULLA, in Botany, the pith.

MEDUL'LARY RAYS (same *deriv.*), in Botany, the vertical plates of cellular tissue, which radiate from the centre of the stem of exogenous plants through the wood to the bark; they cause the appearance called *silver grain.*——MEDULLARY SHEATH, a thin layer of vessels which surround the pith of exogenous plants. It serves to connect the middle part of the stem and the leaves by means of its spiral vessels.

MEDU'SA, one of the three sister Gorgons, who incurred the displeasure of Minerva, and had her beautiful hair changed by the goddess into serpents. It was fabled that Perseus succeeded in beheading Medusa, and that the serpents which infest Africa sprang from her blood. He had protected himself during the exploit with Minerva's ægis, and the head was placed in the centre of the shield, where it retained the power it had, when living, of turning the beholder to stone.——MEDUSA, in Zoology, a genus of marine animals belonging to the class *Acalephæ*—popularly known as sea-blubbers and jelly-fish The members of the family *Medusadæ* are shaped something like an umbrella, and have various appendages hanging from the upper side. Ships at sea frequently pass amongst vast numbers of them. They have a stomach or digestive cavity excavated in the centre of the disc. They swim by muscular contraction of the margin of the disc. A very large portion of them consists of water, which drains away if they are placed on a filter; the solid parts of one weighing ten pounds do not exceed two drachms Many of them are phosphorescent, but the organs which emit the light have not been discovered. Most of them sting and inflame the hand, and the cause of this property is equally unknown.

MEER'SCHAUM (foam of the sea: *Ger.*), a fine sort of Turkish clay, consisting of hydrate of magnesia combined with silex, which, when first dug, is soft, and makes a lather like soap. From this clay, pipes are made in Germany, of various forms. It assumes a beautiful brown colour after it has been used by the smoker for some time.

MEGALOSAU'RUS (*megas*, great; and *sauros*, a lizard: *Gr.*), the name given to an extinct genus of gigantic lizards. Remains have been found in the Stonesfield slate, near Woodstock, a member of the lower oolite.

MEGAPO'DIDÆ, the family of *Mound Birds*, which see.

MEG'ASCOPE (*megas*, great; and *skopeo*, I examine: *Gr.*), an optical instrument for the examination of bodies of large dimensions.

MEGATHE'RIUM (*megas*, great; and *thērion*, a beast: *Gr.*), a genus of extinct animals allied to the sloths, of which remains have been found in the post-tertiary beds of both North and South America. The South American species was 13 feet long, 8 feet high, and had feet a yard in length. It was a ponderous animal, that probably fed on the roots of plants, which its great strength enabled it to tear out of the ground.

MEL'ANITE (*melas*, black: *Gr.*), the *Black Garnet*, a mineral of a velvet-black colour, found in the basalt of Bohemia, and in a rock at Frescati, near Rome.

MELIS'SA (a bee: *Gr.*—because abounding in honey), in Botany, a genus of plants, nat. ord. *Labiatæ*, including the different species of balm.

MEL'LITE (*meli*, honey; and *lithos*, a stone: *Gr.*), the *Honeystone*, a mineral found first in Thuringia. It is yellow and crystallized, and consists of mellitic acid and alumina. The name has been given also to a yellow mineral which occurs in very minute crystals in the fissures and cavities of lava, and the composition of which is not yet known.——**Mellitic Acid**, procured from mellite, is a compound of carbon and oxygen with water.

MEL'ODRAMA (*melos*, a song; and *drama*, a drama: *Gr.*), a dramatic performance in which music is intermixed; or that species of drama in which the declamation of certain passages is interrupted by music. If only one person acts, it is a *monodrama*; if two, a *duodrama*. It differs from the opera and operetta in this, that the performers do not sing, but declaim, and the music only fills the pauses, either preparing or continuing the feelings expressed by the actors. Melodramas are generally romantic and extravagant.

MEL'ODY (*melōdia*: from *melos*, a song; and *ōdē*, an ode: *Gr.*), in Music, the agreeable effect of different sounds, ranged and disposed in *succession*; so that melody is the effect of a single voice or instrument, by which it is distinguished from harmony.

MEL'ON (*Fr*; from *melo*: *Lat*), the fruit of a plant, the *Cucumis melo*, belonging to the nat. ord. *Cucurbitaceæ*. There are many varieties in cultivation. Its native country is Asia. The *Water melon* is the fruit of the *Cucurbita citrullus*, another plant of the same nat. ord. As the fruit is cool and refreshing, it is cultivated extensively in warm countries.

MEM'BRANE (*membrana*: *Lat.*), in Anatomy, a broad nervous and fibrous substance, which serves as a covering for different parts of the body, particularly the brain and the viscera. The membranes differ in thickness, according to the smallness of their fibres, or the number of their planes. These latter are termed *laminæ*, and are distinguished into internal, external, and medial. Small portions of membranes, especially when they are very thin, are called *pellicles*; and some membranaceous laminæ are united together by the intervention of a particular substance, composed of these pellicles, and called the *cellular* or spongy substance.

MEMBRANOL'OGY (*membrana*, a membrane: *Lat.*; and *logos*, a discourse: *Gr.*), that branch of anatomy which treats of the membranes of the body.

MEM'OIRS (*mémoires*: *Fr.*), a species of history, written by persons who had some share in the transactions they relate; answering to what the Romans called *commentarii* (commentaries). They furnish the reader with interesting individual anecdotes, and often expose the most secret motives, or disclose the whole character of events, which may be barely hinted at in books of general history.——Also, short essays on particular subjects.

MEM'ORY (*memoria*: *Lat.*), that faculty of the mind by which it retains the knowledge of past impressions, a faculty which differs greatly in different individuals, and in the same individual at different ages, but in all it may be much improved by cultivation.——*Local memory*, among orators, is but the associating the different heads to be treated of with the objects before the speaker's eyes; so that, by only looking around him, he is put in mind of what he is to say.——*Artificial memory* (*memoria technica*) signifies a method of assisting the memory by some artificial contrivance, as that of forming certain words the letters of which shall signify the date or era to be remembered. [See **Mnemonics**.]

MENACH'ANITE, in Mineralogy, ferruginous oxide of titanium; so called from having been found in the vale of Menachan, in Cornwall

MEN'DICANTS (*mendico*, I beg: *Lat.*), a term applied to several orders of monks who live on alms, or beg from door to door.

MENDO'SA SUTU'RA (a false joining: *Lat.*), in Anatomy, a scaly joining together of bones, as in those of the temple.

MENIS'CUS (*mēniskos*, a half moon: *Gr.*), in Optics, a lens, convex on one side, and concave on the other, and on which the two surfaces would meet if continued, wherein it differs from a concavo-convex lens, in which the two surfaces would not meet if continued.

MEN'IVER (*menu vair*: *Fr.*), the old name of the ermine.

MENOL'OGY (*mēn*, a month; and *logos*, a discourse: *Gr.*), in the Greek church, a brief calendar of the lives of the saints, or list of those whose lives are not written. It is the same as *martyrology* in the Roman Catholic church.

MEN'SA (a table: *Lat.*), in Archæology, denotes all patrimony or goods necessary for a livelihood.

MENSA'LIA (pertaining to the table: *Lat.*), such parsonages or spiritual livings as were intended to provide for the tables of religious houses: they were called by the canonists *mensal benefices*.

MEN'STRUUM (*mensis*, a month: *Lat.*), in Chemistry, any fluid which dissolves a solid body. In the language of the older chemists, it meant some preparation which could operate effectually only at some particular period of the moon or month.

MENSURA'TION (*mensuratio*, from *mensuro*, I measure: *Lat.*), the art or process of ascertaining the lengths or contents of lines, surfaces, or solids; it is also applied to determine the heights, depths, or distances of bodies and objects. It therefore includes longimetry, or the art of measuring lines; planimetry, or the method of measuring surfaces; and stereometry, or the art of measuring solids. The mensuration of a plane superficies, or surface, lying level between its several boundaries, is easy. The surface of any *parallelogram* is the product of one side and its perpendicular distance from the opposite side. The surface of a *triangle* is its base multiplied by half its height, or its height by half its base: the height of a triangle is taken by means of a perpendicular to the base, let fall from the apex or summit. The surface of a *sphere* is equal to the perimeter of its great circle multiplied by its diameter. The surface of a *trapezoid* is half the sum of its parallel sides, multiplied by their perpendicular distance. The surface of any *irregular figure* may be found by dividing it into triangles, measuring them separately, and adding the resulting areas together. The solid contents of a *cube* are found by cubing one of its dimensions. The solid contents of any *prism* are obtained by multiplying the surface of one base by its perpendicular distance from the other. The solid contents of a *pyramid* are found by multiplying the base by one-third of the altitude. The solid contents of the *frustum of a pyramid* are found by multiplying half the sum of the surfaces of the upper and lower bases by the perpendicular distance between them, or the solid contents of the original pyramid, minus that of the part cut off. The solid contents of a sphere are found by multiplying the surface by one-third of the radius.

MEN'THA (*Lat.*; from *mintha* · *Gr.*), in Botany, a genus of plants, nat. ord. *Labiatæ* or *Lamiaceæ*, including the species of mint.

MEPHIT'IC (*mephitis*, a bad smell · *Lat.*), a term equivalent to *noxious*, *pestilential*, or *poisonous*, and applied generally to vapours of that description. Carbonic acid and sulphuretted hydrogen may be considered as mephitic gases. These are emitted from the ground in some places in such quantities that living beings are killed in a few minutes. The celebrated Grotto del Cane, near Naples, is one of these places; and another is a small valley called Guevo Upas, or the Valley of Poison, in the interior of Java. This place is thus described by a traveller:—On arriving at the foot of the mountain we left our horses, and scrambled up the side. When within a few yards of the valley we experienced a strong, nauseous, sickening, and suffocating smell; but on coming close to the edge, this smell ceased. We were now lost in astonishment at the awful scene below us. The valley was about half a mile in circumference, oval, the depth from thirty to thirty-five feet, the bottom quite flat and without vegetation, the whole covered with the skeletons of human beings, tigers, deer, and many other beasts and birds. We could not perceive any vapour or opening in the ground, which appeared to be of a hard sandy substance. We descended to within eighteen feet of the bottom; here we did not experience any difficulty in breathing, but a sickening, nauseous smell. A dog was fastened to the end of a bamboo, and sent in; in 14 seconds he fell on his back; he did not move his limbs, but continued to breathe 18 minutes. Another dog walked in to where the other dog was lying; in 10 seconds he fell on his face, and never moved his limbs afterwards, though he continued to breathe for 7 minutes. A fowl died in a minute and a-half.

MERCA'TOR'S CHART or PROJECTION, a chart, in which the parallels of latitude and the meridians are represented by straight lines perpendicular to each other. The sphere is thus represented, not as it can be seen from any one point, but as an eye would see it if carried successively over every part of it. The form of every small piece of land is truly represented, but the scale of representation varies greatly in different regions, the polar parts being much enlarged. It was invented by George Kaufmann, usually called *Mercator* (Kaufmann, *Ger.*, and mercator, *Lat.*, signifying the same thing—a merchant), who was born in 1512. This projection is universally adopted in nautical charts, and its advantage is, that the rhumb, or sailing course between two points, is a straight line. The degrees of longitude are all equal; but the degrees of latitude marked on the meridian form a scale of which the distances go on increasing from the equator towards the poles. This is done for the purpose of maintaining the proper proportion between the degrees of latitude and the degrees of longitude, which are rendered greater than they should be. Such a compensation causes the *rhumb*, or line representing the ship's course, to make the same angles with the different lines of the chart that it does in reality with the different lines of the sphere; while, at the same time, it is a right line. And since, by keeping the lines which represent meridians parallel, the degrees of longitude have been rendered too large, in the ratio of the radius to the secant of the latitude, the degrees of the meridian are made also to increase towards the poles, as the secant of latitude increases. Hence, though the distances are distorted, the latitude, longitude, and bearings of places, are represented truly on Mercator's chart.

MER'CURY (in Latin, *hydrargyrum*; from *hudôr*, water; and *arguros*, silver: *Gr.*), a metal found chiefly as a sulphuret, and sometimes native. It is white, and very brilliant; becomes solid at 38° below zero, and boils at 662°. It is not affected by the atmosphere at common temperatures, but is changed into red oxide by heating it to near its boiling point. Its spec. grav. is 13·5. It forms two oxides—the black protoxide, and the red peroxide; two chlorides—the protochloride or *calomel*, and the perchloride or *corrosive sublimate*; and two sulphurets—the black protosulphuret, and the bisulphuret, *cinnabar* or *vermilion*. It combines also with iodine, &c.——MERCURY, in Astronomy, a small planet that emits a bright light; though, on account of its proximity to the sun, it is seldom seen by the inhabitants of the earth. Its mean distance from that luminary is about 36,000,000 miles, or a little more than one-third of the earth's distance. Its mean sidereal revolution is performed in about 88 mean solar days. Its diameter is about 3140 miles. Its orbit is inclined to the ecliptic at an angle of 7° 0′ 9″. On account of its being so small, and so near the sun, its surface cannot be clearly distinguished. Sometimes, in the evening, it may be seen crossing the sun's disc, under the form of a black spot—which passage is called the *transit of Mercury*, and is in reality an annular eclipse of the sun. On account of its rapid motion, the Greeks called this planet after the name of the swift messenger of the gods, and represented it by the figure of a youth with wings at his head and feet.

MER'CY-SEAT, in Scriptural Antiquities, a table, or cover, lined on both sides with plates of gold, and set over the ark of the covenant; on each side of which was a cherub of gold, with wings spread over the mercy-seat

MERID'IAN (*meridies*, midday: *Lat.*—because it is noon at any place when the sun is on its meridian), in Astronomy, a great circle of the celestial sphere, passing through the poles of the earth, and also the zenith and nadir, crossing the equinoctial at right angles, and dividing the sphere into two equal parts, or hemispheres, the one eastern and the other western.——In Geography, the meridian is a great circle, passing through the poles of the earth, and any given place whose meridian it is; and it lies exactly under, or in the plane of, the celestial meridian. Meridians are various, and change according to the longitude of places, so that their number may be said to be infinite, for all places from east to west have their meridians The *first meridian* is that from which all the others are reckoned, and which, being totally arbitrary, has been variously chosen by different geographers; but most nations now assume the meridian of the place where they live, the capital of their country, or its chief observatory, for a first meridian; and from thence reckon the longitude of places, east and west. Thus, the British reckon from the meridian of Greenwich; the French from that of Paris; the Spanish from that of Madrid, &c. ——**MERIDIAN** of a globe, the brazen circle on which it turns, and by which it is supported. It is divided into 360 equal parts, called *degrees*. On the upper semicircle of the brass meridian, these degrees are numberd from 0 to 90, or from the equator towards the poles, and are used for finding the latitudes of places. On its lower semicircle they are numbered from 0 to 90, or from the poles towards the equator, and are used in the elevation of the poles.——**MERIDIAN LINE**, an arc, or part of the meridian of a place terminated each way by the horizon. The exact determination of this line is of the greatest importance in all cases relating to astronomy, geography, dialling, &c.——**MAGNETIC MERIDIAN**, a great circle which passes through the assumed magnetic poles, and in the plane of which the needle of the mariner's compass arranges itself. ——**MERIDIAN ALTITUDE** of the sun or stars, their altitude when in the meridian of the place where they are observed. Or it may be defined, an arc of a great circle perpendicular to the horizon, and comprehended between the horizon and the sun or star then in the meridian of the place.——**MERIDIONAL DISTANCE**, in Navigation, the difference of longitude between the meridian under which the ship is at present, and any other she was under before.

MER'LIN (*meerlin*: *Belg.*), the *Falco æsalon* of ornithologists. 'So bold as well as powerful,' says Yarrell, 'in proportion to his size is this little bird, that a male Merlin, not weighing more than six ounces, has been seen to strike and kill a partridge that was certainly more than twice his own weight.'

MER'LON, in Fortification, that part of a parapet which is terminated by two embrasures of a battery.

MER'MAID (*meer*, the sea; and *magd*, a maid: *Ger.*), an imaginary or fabulous creature, which seamen have described as having the head and body of a woman, with the tail of a fish *Mermen* also have been supposed to exist. The *dugong* and *manatee*, when seen at a distance, may have given rise to the idea of mermen and mermaids, &c.

ME'ROPS (*merŏps*: *Gr.*), in Ornithology, the *Bee-eater*, one of the insessorial birds

MER'ULA (*Lat.*), in Ornithology, the *Blackbird*, one of the dentirostral perchers.

MESEMBRYAN'THEMUM (*mesēmbria*, midday; and *anthos*, a flower: *Gr.*—because it expands its flowers at noon), in Botany, a large genus of plants, nat ord. *Ficoideæ* or *Mesembryaceæ*. The species are perennials, and consist of the different *Fig marigolds*, all natives of the Cape of Good Hope. The ice-plant belongs to this genus. All the species have fleshy leaves.

MES'ENTERY (*mesenteron*: from *mesos*, middle: and *enteron*, an intestine: *Gr.*), in Anatomy, a thick membrane, placed in the middle of the intestines. Its substance is composed of membranes, fat, vessels of all kinds, and a number of glands. In the upper part, it is connected with the three superior vertebræ of the loins; and in the lower, with the intestines, and particularly with the *jejunum* and *ileum*, to which it also gives their outer coat. The uses of the mesentery are, to support, connect, and retain in their place, all the intestines; and to sustain their sanguiferous and lacteal vessels

MES'MERISM. [See MAGNETISM, ANIMAL.]

MESNE (middle: *Fr.*), in Law, a lord of a manor, who has tenants holding under him, though he holds the manor of a superior.——**MESNE PROCESS**, an intermediate process which issues pending a suit, upon some collateral interlocutory matter Sometimes the term is used in contradistinction from *final process*, or *process of execution*, and then it signifies all such processes as intervene between the beginning and end of a suit.

MESOCO'LON (*mesokŏlon*: from *mesos*, middle; and *kŏlon*, the colon: *Gr.*), in Anatomy, that part of the mesentery, which, having reached the extremity of the *ileum*, contracts and changes its name; or the portion of the mesentery to which the *colon* is attached.

MES'OLYTE (*mesos*, middle: and *lithos*, a stone: *Gr.*), in Mineralogy, a hydrated silicate of alumina, lime, and soda; called also *Needlestone*.

MES'OTYPE (*mesos*, middle; and *tupos*, a form: *Gr.*), in Mineralogy, hydrated silicate of alumina and soda, called also *Natrolite*.

MESOZO'IC (*mesos*, middle; *zoe*, life: *Gr.*), a term applied by some geologists to that great division of strata containing the remains of the middle forms of life, which others denominate secondary.

MESS (*mese*: *Sax.*), in Military language, a sort of ordinary or public dinner, for the maintenance of which every officer who takes his meals there gives a certain proportion of his pay.——In Naval language, a particular company of the officers or crew of a ship, who eat, drink, and associate together; and the term *messmate* is applied to any one of the number thus associated.

MESSI'AH, a Hebrew word, signifying *the anointed*, and translated into Greek by the word *christos*, whence Christ: a title which the Jews gave to their great deliverer, for whose coming they still wait; and a name which Christians apply to Jesus Christ, as the person in whom the prophecies relating to the Messiah were accomplished. Among the Jews, anointing was the ceremony of consecrating persons to the highest offices and dignities; kings, priests, and sometimes prophets were anointed, thus, Aaron and his son received the sacerdotal, Elisha the prophetic, and David, Solomon, and others, the royal unction.

METAB'ASIS (*Gr.*, from *metabaino*, I go from one place to another), in Rhetoric, *transition*; a passing from one thing to another.

METACAR'PUS (*meta*, after; and *karpos*, the wrist: *Gr.*), in Anatomy, that part of the hand between the wrist and the fingers. It consists of five bones placed side by side. The inner part of the metacarpus is called the palm, and the outer the back of the hand.

METACH'RONISM (*meta*, after, and *chronos*, time: *Gr.*), an error in chronology, which places an event after its real time.

METAL (*metallon*: *Gr.*), a simple, fixed, opaque substance, possessing a peculiar lustre. The metals are all electro-positive; they differ much in their tenacity, malleability, ductility, hardness, volatility, and density, and in the facility with which they combine with non-metallic elements. There is a distinction to be made between malleability and ductility, since the metals which afford the finest wire do not always give the thinnest leaves. Some metals are found *native*, that is, uncombined. Some of their ores are reduced by heat alone: others require heat and a combustible. Some are reduced by deoxidizing agents, or by other metals which take their places in combination. Metals, in the state of oxides, are capable of uniting with acids. All earths, with perhaps one exception, are combinations of some metal with oxygen. When exposed to the action of oxygen, chlorine, or iodine, at an elevated temperature, the metals generally take fire, and, combining with one or other of these three elementary bodies in definite proportions, are converted into earthy or saline-looking substances, devoid of metallic lustre or ductility, and called *oxides*, *chlorides*, or *iodides*. Formerly only seven metals were known, or had been separated from the materials with which they were combined. And even these were discovered only on account of their being sometimes found native, or in a state of combination from which they were liberated without very great difficulty. Their names are copper, gold, iron, lead, mercury, silver, tin. Chemical research has added forty-four others:—Aluminium, antimony, arsenic, barium, bismuth, cadmium, cæsium, calcium, cerium, chromium, cobalt, columbium or tantalum, erbium, glucinum, indium, iridium, lanthanum, lithium, magnesium, manganese, molybdenum, nickel, niobium, norium, osmium, palladium, pelopium, platinum, potassium, rhodium, rubidium, sodium, strontium, tellurium, terbium, thallium, thorium, titanium, tungsten, uranium, vanadium, yttrium, zinc, and zirconium. [See these in their proper places, and CHEMISTRY.] The metals are all conductors of heat, and, at least in the solid form, of electricity.

METALEP'SIS (*Gr.*, from *metalambano*, I participate: *Gr.*), in Rhetoric, the continuation of a trope in one word, through a succession of significations; or the union of two or more tropes of a different kind in one word, so that several gradations or intervening senses come between the word expressed and the thing intended by it.

METAL'LIC VEINS, in Mineralogy, fissures across the solid strata of the earth, in which metallic ores are found. These were probably deposited in them from a state of vapour. Veins differ in their magnitude and position; some vary from sixty to one hundred feet wide in certain parts, and are not more than ten or twenty in others; they are commonly filled with what is called vein stuff, mixed with the metal; others are only a few inches wide. Those which are fissures or rents, are not perpendicular, but incline more or less, and are open from the surface of the earth to the depth of 20 to 30 fathoms. They are not the only repositories for metals; there are other deposits which are called flat or pipe veins, the solid rock forming the roof and bottom of the mine. These are irregular in their direction and magnitude, and appear like a series of small caverns, connected with each other. The top, bottom, and boundaries are lined, and sometimes filled, with spar, lead ore, &c., and the latter are found in nests, filling cavities in solid limestone, and even penetrating fossil shells. The rocks in which metallic veins are situated do not contain a particle of the metal which they enclose. Inconsiderable veins, which diverge from the principal, are called *slips*; and such masses of ore as are of considerable magnitude, but no great length, are called *bellies* or *stock-works*.

METALLOG'RAPHY (*metallon*, a metal; and *grapho*, I write: *Gr.*), a treatise on metallic substances.

MET'ALLOIDS, in Chemistry, a collective name sometimes given to those elementary bodies which are either transparent or non-lustrous, and bad conductors of electricity and heat, in contradistinction to the true metals, which are opaque, lustrous in a high degree, and good conductors of electricity and heat. Metalloids include not only the four elementary gases, but sulphur, phosphorus, arsenic, and other bodies.

MET'ALLURGY (*metallon*, a metal; and *ergon*, a work: *Gr.*), the art of obtaining metals from their ores, and preparing them for the various uses to which they are applied. It comprises the processes of *assaying*, *refining*, and *smelting*

METAMOR'PHIC (*meta*, indicating change; and *morphē*, form: *Gr*), a term applied to crystalline rocks which occur especially in the central ridges of mountain chains. It denotes that their structure has been changed since the time of their first deposition as sedimentary beds, by plutonic action

METAMOR'PHOSIS (*metamorphōsis*, from same: *Gr.*), the changing of something into a different form · in which sense it includes the transformation of insects, as well as the mythological changes related by the poets of antiquity——By the *metamorphoses of insects* are meant the successive transformations through which they pass, which, when the metamorphosis is complete, are from the egg to the caterpillar or larva state; to the chrysalis, pupa, or aurelia state; and lastly to the moth or butterfly form, when, having laid their eggs, they die

MET'APHOR (*metaphora*, from *metaphero*, I transfer: *Gr.*), in Rhetoric, the application of a word in some other than its ordinary sense, on account of some real or imaginary resemblance between two objects: thus, if we call a hero a *lion*, a shrewd crafty fellow a *fox*, and a minister a *pillar* of the state, we speak *metaphorically*.

METAPH'RASIS (*Gr.*, from *metaphrazo*, I translate), a bare or literal translation from one language into another

METAPHYS'ICS (*meta*, after; and *phusis*, nature, *Gr*), the science of the absolute, concerning itself only with essences and causes. It endeavours to treat of things as they are in themselves as distinct from their appearances to the senses.

MET'APLASM (*metaplasmos*, from *metaplasso*, I transform: *Gr.*), in Grammar, a transmutation or change made in a word by adding, transposing, or retrenching a syllable or letter.

METAS'TASIS (*Gr.*, from *methistamai*, I change my position), in Medicine, a translation or removal of a disease from one part to another.

METATAR'SUS (*meta*, after; and *tarsos*, the instep: *Gr.*), in Anatomy, the middle of the foot, or the part between the ankle and the toes: the *instep*. The *metatarsal bones* are the five longitudinal bones between the tarsus and the toes.

METATH'ESIS (*Gr.*, from *metatithēmi*, I place differently), a figure by which the letters or syllables of a word are transposed.——In Medicine, a change or removal of a morbid cause, without expulsion.

METEMPSYCHO'SIS (*Gr*, from *metempsuchoo*, I make the soul pass from one body into another), the doctrine of *transmigration*, which supposes that the soul of man, upon leaving the body, becomes the soul of some other animal. This was the doctrine of Pythagoras and his followers; and is still the prevailing doctrine in some parts of Asia, particularly in India and China

METEMP'TOSIS (*meta*, after; and *empipto*, I fall in with: *Gr.*), a term in Chronology, expressing the *solar equation*, or subtraction of a day, necessary to prevent the new moon from happening a day too late; or the suppression of the bissextile once in 134 years.

ME'TEOR (*meteōros*, aloft: *Gr.*), in Natural History, a phenomenon which occurs in the atmosphere. Meteors, in the most general sense of the word, may be reduced to four classes—*igneous* or *fiery* meteors, including fire-balls, falling stars, lightning, and St Elmo's fire; *luminous* meteors, as the aurora borealis, zodiacal light, parhelia or mock-suns, haloes, &c.; *aqueous* meteors, as clouds, rain, hail, snow, &c.; and *aerial* meteors, as wind and water-spouts. It will be seen that these phenomena are of very different natures, and owing to different causes. The only connection between them is that of a common medium; and we therefore refer to the separate articles for information concerning them; also to ELECTRICITY, METEORIC STONES, FALLING STARS, &c.

METEOR'OLITES (*meteōros*, aerial; and *lithos*, a stone: *Gr.*), *meteoric stones.* [See AEROLITES, and FALLING STARS.]

METEOROL'OGY (*meteōros*, a heavenly body: and *logos*, a discourse: *Gr*), the science which treats of the phenomena of the atmosphere. These may be classed under distinct heads, viz. the alterations that occur in the weight of the atmosphere; those that take place in its temperature; its changes as regards moisture; and those which arise from electric and other causes.——From chemistry, meteorology borrows *analysis*, to determine the composition of the air itself, and of the substances which it contains, or by which it is acted upon. From the laws of heat it ascertains the manner in which the different processes of evaporation, freezing, thawing, &c., go on, and how they affect the state of the atmosphere; the action of those invisible agents, light, heat, electricity, &c, and their extraordinary effects. From physics, meteorology takes the mechanical action of these and similar powers and substances; the weight and velocity of the air; the laws of the reflection, refraction, and motion of light, &c By these aids this science explains the formation, fall, or deposition of hail, snow, rain, dew, and frost; the action of thunder and lightning; the prevalence and properties of certain winds; the nature and causes of meteors, &c. All this, and more, is to be carefully studied by every one who would keep a meteorological register, from which, if carefully attended to, a body of principles may be derived that would go far to dispel a host of popular errors and delusions, and make the value of true meteorological science manifest to the most common observer.

METEOROS'COPY (*meteōros*, a heavenly body; and *skopeo*, I examine: *Gr.*), among the older astronomers, that part of science which treats of the distance of the stars and other celestial bodies: but now very properly restricted to what relates to the nature of meteors.

METHEG'LIN (*meth*, mead: *Ger.*), a liquor made of honey and water, boiled and fermented, often flavoured with spices.

METH'OD (*methodos*, literally a journey taken in search of anything: *Gr.*), a suitable and convenient arrangement of things or ideas. In Logic and Rhetoric, the art of disposing ideas in such a manner that they may be easily comprehended, in order either to discover the truth, or to demonstrate it to others. Method is essential to science, and without it business of any kind will fall into confusion. In studying a science, we generally mean by *method* a system of classification or arrangement of natural bodies according to their common characteristics; as the method of Ray, the Linnæan method, &c. The difference between *method* and *system* is this: *system* is an arrangement founded, throughout all its parts, on some one principle; *method* is an arrangement less fixed and determinate, and founded on more general relations.

METHOD'IC SECT (*methodos*, method: *Gr.*), a name given to certain ancient physicians, who conducted their practice by rules after the manner of Galen and his followers, in opposition to the *empiric sect*.

METH'ODIST (same *deriv.*), a term originally applied to a sect of physicians at Rome, who, under the name of *methodici*, practised only by theory. It is now used to designate the followers of Wesley and Whitfield, the former professing the doctrines of Arminius, and the latter of Calvin; and also several sects of Christians who have seceded from the Wesleyan denomination. In 1729, after the revolution, the brothers John and Charles Wesley, believing they perceived great lukewarmness in matters of religion, formed an association for the observance of more strict and rigid rules regarding the regulation of their time and studies and the practice of religious exercises. John Wesley, who took the most active part in this religious movement, having been ordained, officiated for some time in England; then visited North America. But, on his return, giving offence to some of the higher ranks of the clergy by his enthusiastic and declamatory mode of preaching, the churches were generally shut against him, which led him to become the founder of a new class of dissenters, without having at first intended it. He preached in dissenting chapels in London and elsewhere, and great success attended his exertions; having had recourse to lay preachers, who proved most efficient in forwarding his views, he was enabled to exercise superintendence over all his congregations. He required his followers to attend the established church, when they had no opportunity of hearing his preachers; but he differed in many points from what is generally considered to be the doctrines of the thirty-nine articles. According to his system of church government, each society is divided into *classes* of from twelve to twenty persons, one of whom is termed a *leader*. Each society has *stewards*, whose office is somewhat similar to that of *deacons* in the established church. The leaders, stewards, and minister hold once a week what is called the *leaders'* meeting. A number of these societies constitute a *circuit*, of which one of the ministers of the district is *superintendent*. The ministers, leaders, and stewards in the circuit hold a *quarterly meeting*, on which occasion the stewards deliver their collections to a *civil steward*. From five to fifteen circuits form a *district*, the ministers of which hold an annual *district meeting*: this assembly tries ministers, and suspends those whose conduct is proved to be immoral, whose doctrine is erroneous, or who are deficient in ability; and performs a number of other important duties. The *conference*, whose decisions are final, should consist, strictly speaking, of a hundred of the senior itinerant preachers; but it is generally composed of preachers elected at the previous district meetings, and of all the ministers who choose to attend, every one present at it having a right to vote. All regulations are framed by this body; funds are levied in its name; it appoints ministers to the stations they are to occupy; it appoints superintendents, &c. In 1850, the Wesleyan methodists, at home and abroad, amounted to upwards of two millions, and the total number of preachers was 6000. Various offshoots have taken place among them at various times; the earliest of which comprised the followers of Whitfield—at first the coadjutor, but afterwards the eloquent opponent, of Wesley.

METH'YL (*methu*, wine; *ule*, wood: *Gr.*), a hypothetical compound radical, the constituents of which are two atoms of carbon and three of hydrogen. It is the base of a large number of spirits and ethers, of which the best known is the hydrated oxide, wood naphtha or pyroxilic spirit. This was first obtained by the destructive distillation of wood. It is a volatile inflammable liquid, resembling spirit of wine.——**METHYLATED SPIRIT** is pure spirit of wine to which one-tenth of its volume of wood naphtha, otherwise pyroxilic spirit, has been added. (See the last article.) This, on account of its offensive odour and taste, prevents the compound being drunk, whilst it can still be employed in many of the useful arts, and it is therefore exempt from duty.

METOCHE' (*metochē*, a sharing: *Gr.*), in Architecture, the space between two dentils.

METON'IC CY'CLE, in Chronology, the period of nineteen years, or rather of 6940 days, in which the lunations of the moon return to the same days of the month; so called from its discoverer Meton, an Athenian, who lived about 400 B.C. On account of its great use in the calendar, the number of the year in this cycle is called the *golden number*.

METONY'MIA or **METON'YMY** (*metōnumia*: from *meta*, indicating change; and *onoma*, a name: *Gr.*), in Rhetoric, a figure of speech by which one thing is put for another: as the cause for the effect, the part for the whole, and the like. Thus, 'my friend keeps a good *table*,' instead of good *provisions*; 'that boy has a clear *head*,' meaning *intellect*.

MET'OPE (*metopē*: from *meta*, between; and *opē*, the hole in which a beam of the roof is inserted. *Gr.*), in Architecture, the interval, or space, between the triglyphs of the Doric frieze, which among the ancients were usually painted or adorned with carved work, representing the heads of oxen, &c.

METOPOS'COPY (*metōpon*, the forehead; and *skopeo*, I examine: *Gr.*), the study of physiognomy.

ME'TRE (*metron*, a measure: *Gr.*), in Poetry, a system of feet composing a verse: as *pentameter*, a verse of five feet; *hexameter*, a verse of six feet, &c. When the last syllable of the last foot is wanting, the line is *acatalectic*; when its two last syllables are cut off, it is *brachycatalectic*; when it has one superfluous syllable at the end, it is *hypercatalectic*.——METRE, a French measure equal to 39·37079 inches. It is the French standard of lineal measure; being the ten-millionth part of the distance from the equator to the north pole, as ascertained by actual measurement of an arc of the meridian.

METROCEL'IDES (*mētēr*, a mother; and *kēlis*, a stain: *Gr.*), in Medicine, marks or blemishes, supposed by some to be impressed upon the child by the mother's imagination.

METROP'OLIS (*Gr.*: from *mētēr*, a mother; and *polis*, a city), a word used by Greek writers to indicate the parent state whence colonies have sprung. Also, the chief city of a province, in the latter ages, of the Roman empire. The church having adopted the secular division of the Roman empire into provinces, an episcopal see was established in every such city, and its bishop was termed a *metropolitan*.——In modern use it means the capital or principal city of a country or province, as London or Paris.

MEZ'ZANINE (*mezzano*, middle: *Ital.*), in Architecture, a low story introduced between two higher ones.

MEZ'ZO, in Music, an Italian word signifying *half*. Thus *mezzo forte*, *mezzo piano*, *mezzo voce*, imply a middle degree of *piano* or soft, &c. By *mezzo soprano* is understood a compass of voice between the soprano or treble and counter-tenor.

MEZZOTIN'TO (half tinted: *Ital.*), a particular manner of engraving. [See ENGRAVING.] By an artificial disposition of the shades, and different parts of a figure, on different plates, mezzotintos are printed in colours, so as to represent actual paintings.

MIAS'MA (*Gr.*, from *miaino*, I taint), the contagious effluvia of any putrefying bodies, rising and floating in the atmosphere, and considered to be noxious to health. The term is specially applied to *marsh miasma*, the *malaria* of the Italians. One of the most powerful correctors of miasmatic effluvia is chloride of lime.

MI'CA (*mico*, I glitter: *Lat.*), called also *talc*, *glimmer*, and *Muscovy glass*, is a mineral of a foliated structure. It consists of a number of thin laminæ adhering to each other; and has long been used as a substitute for glass, particularly in Russia. Its chief constituents are silica, alumina, potash, and oxide of iron. It is one of the substances which constitute *granite*.

MI'CAH, a canonical book of the Old Testament, written by the prophet Micah; in which the writer censures the reigning vices of Jerusalem and Samaria, and denounces the judgments of God against both kingdoms.

MICH'AELMAS, or FEAST OF ST. MICHAEL, a festival observed on the 29th of September. One of the quarterly days for paying rent.

MI'CROCOSM (*mikros*, small; and *kosmos*, world: *Gr.*), a name given by some writers to man, on account of a supposed correspondence between the qualities of his nature and those of the universe.

MICROG'RAPHY (*mikros*, small; and *grapho*, I write: *Gr.*), the description of objects which are too minute to be seen without the help of a microscope.

MICROM'ETER (*mikros*, small; and *metron*, a measure: *Gr.*), an instrument fitted to telescopes or microscopes for the purpose of measuring small angles with precision.

MI'CROSCOPE (*mikros*, small; and *skopeo*, I examine: *Gr.*), an optical instrument consisting of an arrangement of lenses which enables the observer to see an object, or its true image, nearer than with the naked eye, and magnified accordingly. Microscopes are either simple or compound. By the former we look directly at the object; by the latter at its magnified image. The increase of apparent magnitude obtained by the employment of lenses is proportional to the difference of the distance of an object from the lens and the distance at which it can be seen without such assistance. This latter distance (the distance of distinct vision of minute objects with the naked eye) varies in different persons, and at different periods of life. Some authors adopt ten inches as the standard, under ordinary circumstances, and its decimal character makes it a convenient multiplier or divisor. The microscope has been greatly improved of late years, and it is extensively employed by medical men in the investigation of healthy and diseased structure, and by naturalists in the examination of the minute structure of animals, vegetables, and minerals. So many and so important are the discoveries that have been made by its means, that several branches of science have been entirely changed.——The *solar* *microscope* consists of a common microscope connected with a reflector and condenser, the former being used to throw the sun's light on the latter, by which it is condensed so as to illuminate the object placed in its focus. This object is also in the focus of the microscopic lens, which transmits a magnified image of it to a wall or screen. The principle of the *lucernal microscope* is the same, except that a lamp giving a very strong light—generally that obtained from the flame of oxygen and hydrogen thrown on lime—is used, instead of the sun, to illuminate the object.

MID'DLE A'GES, a term used by historians to denote that period which begins with the final destruction of the Roman empire, and ends with the revival of letters in Europe, or, according to some writers, with the discovery of America; *i. e.* from the eighth to the fifteenth century. They ought rather to be considered to terminate with the invention of printing. In general, it may be said, the middle ages embrace that period of history in which the feudal system was established and developed, down to the most prominent events which necessarily led to its overthrow.

MID'SHIPMAN, in the British navy, a sort of cadet, whose duty it is to second the orders of the superior officers, and assist in the necessary business of the vessel, whether aboard or ashore. No person can receive a commission, without having served a certain number of years in the royal navy in this capacity, unless he has been mate of a merchantman, and passed some years of actual service either in the navy or in the merchant service.

MID'SUMMER, the summer solstice. The 24th of June is Midsummer-day, which is also a quarter-day.

MIGRA'TION OF BIRDS (*migratio*, from *migro*, I change my abode: *Lat.*), the annual passage of birds from one country to another in quest of food and a mild climate. Thus, the swallow and many other species migrate into southern climates during our winter, and return in the spring; whilst other species, like the Snow Bunting and the Bohemian Waxwing, come to us for the winter and fly northwards in the spring. Ornithologists have observed that, on the old continent, birds migrate in autumn to the south-west, and in spring towards the north-east; yet the courses of rivers and chains of mountains exercise considerable influence on the direction of their flight. On the new continent the points of direction are not the same. Captain Sir E. Parry has satisfied himself that the birds of Greenland go to the south-east. It is remarkable, also, that the young of certain species do not make the same journey as the old birds; they go more to the south, so that it is very common to find, in the south of Europe, only the young birds of a certain species, whilst the older ones remain more to the north. In other species the females go farther south. Mr. White, in his *Natural History of Selborne*, says, 'It does not appear to me that much stress may be laid on the difficulty and hazard that birds must run in their migrations, by reason of vast oceans, cross-winds, &c.; because, if we reflect, a bird may travel from England to the equator without launching out or exposing itself to boundless seas—and that by crossing the water at Dover, and again at Gibraltar.' Birds come to these countries, from those which are still colder, during the winter: thus many species of wild duck. Migration is not confined to birds: the musk ox, the reindeer, the Arctic fox, &c., are driven southward, by the rigours of a polar winter. But the animal most remarkable for emigrating is the Scandinavian lemming. [See LEMMING.]

MILE (*mille passuum*, a thousand paces: *Lat.*), a measure of length or distance, which, in England, contains 8 furlongs, or 1760 yards, or 5280 feet. Of such miles there are 69·121 in a geographical degree. But the nautical or geographical mile is the 60th of a degree.——The Roman mile was a thousand paces and equal to 1614 yards English measure, or about 11-12ths of our statute mile.

MIL'IARY GLANDS (*milium*, millet-seed: *Lat.*), in Anatomy, the small and extremely numerous glands which secrete the perspiration.——MILIARY FEVER, a malignant fever, so called from the eruption of certain pustules resembling millet-seeds.

MILI'TIA (military service: *Lat.*), a body of soldiers, regularly enrolled and trained, though not in constant service in time of peace, and thus distinguished from *standing armies*. In England the origin of this national force is generally traced back to Alfred. The most characteristic features of the English militia at present are, that a number of persons in each county may voluntarily enlist for five years, and are officered by the lord-lieutenants, and other gentlemen, under commission from the crown. The period for training and exercise is fixed, generally speaking, at twenty-one days annually. Where men cannot be raised by voluntary enlistment, recourse may be had to the ballot, from which all persons above thirty-five are exempt.

MILK (*milch*: *Ger.*), an animal fluid peculiar to females of the class *Mammalia*, secreted by appropriate glands, and designed to nourish their offspring in the early part of their life. This fluid, which is only produced from the body on occasion of suckling, is, notwithstanding, constantly formed. It is the proper sustenance of the animal itself: all the nutritive parts of food being formed into chyle, and chyle into milk. It is of an opaque white colour, a mild saccharine taste, and a slightly aromatic smell. When allowed to stand for some time, it undergoes spontaneous changes, and is resolved into its component parts, throwing up a white, thick, unctuous *cream* to its surface: the fluid beneath becoming thinner than before, and of a pale bluish colour. The proximate elements of milk are,—1. the *aroma*, or odorous volatile principle, called *butyrin*, which passes off, when it is fresh milked, in the form of visible vapour; 2. *water*, which constitutes the greatest part; 3. fatty matters, from which the cream is formed; 4. *curd*, which is the caseous matter that coagulates; 5. *sugar*, which, with the water, &c., forms the serum of milk , 6 some neutral salts, such as phosphate of lime, iodide of potassium, chloride of calcium, &c., which are accidental, not being found at all times, nor in all milk. Human milk is very sweet and thin ; the nearest in resemblance to this is the milk of asses, next that of mares, then that of goats, and lastly that of cows. *Rennet*, prepared of the juices of such animals as chew the cud, being mixed with milk, coagulates it into a uniform mass, which may be cut with a knife, and which spontaneously separates into *whey* and *curds*. When milk contained in wire-corked bottles is cautiously heated to the boiling point in a water-bath, the oxygen of the included small portion of air under the cork seems to be combined, and the milk will afterwards keep fresh for a considerable time: as green gooseberries and peas do by the same treatment. *Butter* and *cheese* are made of milk, by processes not necessary to describe in this place.

MILKY WAY, in Astronomy [See GALAXY.]

MILL (*mulē: Gr.*), a complicated engine, or combination of machinery, to effect purposes which require great force. The power employed is sometimes water, sometimes wind, and at others steam or horses. The principle is always the same ; a main shaft enters the works, to which wheels with cogs, or drums and bands, are affixed, other wheels are then connected with these in various directions, and the resulting force applied to any intended purpose. When corn is to be ground, large stones, cut in grooves, are made to work one against the other in such a matter as to break or pulverize the grain. There are also bark mills, paper mills, oil mills, silk, cotton, and flax mills, saw mills, &c.

MILLENA'RIANS, or CHILIASTS (*mille anni*, a thousand years: *Lat*; *chilias*, a thousand : *Gr.*), a name given to those who, in the primitive ages, believed that the saints will one day reign on earth with Jesus Christ a thousand years—an idea derived from Rev. xx. 6. The Millenarians held, that after the coming of Antichrist, and the destruction of all nations which will follow, there shall be a resurrection of the just alone ; that all who shall be found upon earth, both good and bad, shall continue alive—the good, to obey the just who are risen as their princes—the bad, to be conquered by the just, and to be subject to them ; that Jesus Christ will then descend from heaven in his glory ; that the city of Jerusalem will be rebuilt, enlarged, embellished, and its gates stand open night and day. The Millenarians founded their belief on the Mosaic history of the creation. Considering this history as a prototype of the fate of the world, and concluding from Psalm xc. that 1000 years make with God one day, they beheld in the six days of creation 6000 years of terrestrial labours and sufferings, and in the seventh the day of rest, a period of 1000 years, in which the reign of Christ should be established. This reign of 1000 years is usually styled the *millennium*. It has been expected by some in all ages of the church, from the second century, and it is the doctrine of many in modern times.

MIL'LEPEDE (*mille*, a thousand : and *pes*, a foot : *Lat.*), an articulated animal, having many feet. There are several species, some of considerable size.

MIL'LEPORE (*mille*, a thousand : and *porus*, a passage : *Lat.*), in Zoology, a genus of corals which have a surface perforated with small holes or pores. When in a fossil state, they are termed *milleporites*.

MIL'LET (*Fr.*; from *milium*: *Lat.*), a plant classed among the grasses, though some of its species attain a height of about 20 feet. The most common kinds are the Polish, the common German, and the Indian. In some parts of Europe, millet is used instead of rice or sago by the poorer classes; but it is more usually employed for feeding chickens. This climate is neither dry enough nor warm enough for its cultivation.

MIL'LING (*mulē*, a mill . *Gr.*), a process in coining, which consists in stamping the coin by means of a machine called a *mill*, in place of striking it with a hammer, the method formerly employed. This engine will coin 20,000 *blanks* in one day. The blanks are circular pieces of metal, of a proper size, thickness, and weight, and with flat smooth surfaces, suited to receive the impressions of the dies, which are of steel, and have engraved upon them the figures, &c to be stamped on the coins. The blank is fixed between the dies, and an impression is taken from both at once.——The word *milling* is applied also to the production of small transverse corrugations on the edges of the heads of screws, intended to make it more easy to turn them round by the fingers, and also to those on the *edges* of coins to prevent the fraudulent removal of the metal at the edge

MILL'-STONE, or BUHR STONE, in Mineralogy, a siliceous stone, occurring in large masses, with a straight fracture, but not so brittle as flint, though of the same hardness. It is feebly translucent, and of a greyish hue. Buhr stone is found in abundance only in the mineral basin of Paris and a few adjoining districts. It forms a part of a fresh-water formation.

MILT (*Sax.*), in Anatomy, the *Spleen*, a viscus situated in the left hypochondrium under the diaphragm. Also, the soft *roe* of fishes, or the spermatic part of the males

MIME (*mimos*, an imitator: *Gr.*), in ancient comedy, a person who acted any character by mere gestures, &c. When the acting consisted entirely in gestures, it was termed *pantomima*.

MIME'SIS (*Gr.*, from same), in Rhetoric, imitation of the voice and gestures of another person.

MIMO'SA, in Botany, a genus of leguminous shrubs, inhabiting the tropics, so called from the remarkable property possessed by several species, especially the *M. pudica*, of shrinking from the touch and giving signs, as it were, of animal life and sensation. This motion it performs by means of three distinct articulations, viz.

that of a single leaf to its pedicle, of the pedicle to its branch, and of the branch to the trunk or main stem.

MI'NA (*mna: Gr.*), a Grecian coin, of different values in different places. The Attic mina was valued at 100 drachmæ, or *4l.* 13*s.* 4*d.* Sixty of them were equivalent to a talent.——MINA, a Grecian weight, also equal to 100 drachmæ, or 15 oz. 83¾ grs.

MIN'ARET (*menarah*, a lantern: *Arab.*), a round tower or column, generally surrounded with balconies, and erected near the mosques in Mohammedan countries. The people are summoned to prayers by a crier stationed at the top, the use of bells not being permitted.

MIND (*gemind: Sax.*), the intellectual power in man. 'When the mind, says Locke, 'turns its view inwards upon itself, thinking is the first idea that occurs; wherein it observes a great variety of modifications, whence it frames to itself distinct ideas. Thus, the perception annexed to any impression on the body by an external object is called sensation; when an idea recurs without the presence of the object, it is called remembrance; when sought after by the mind, and again brought into view, it is recollection; when the ideas are taken notice of, and, as it were, registered in the memory, it is attention; when the mind fixes its view on any one idea, and considers it on all sides, it is called study.'

MINE (*Teut.*), a cavity under ground, formed for the purpose of obtaining minerals, and often very deep and extensive. The descent into it is by a pit, called a *shaft*, and the excavations which follow the minerals sought are called the *workings*. The art of *mining* includes the scientific knowledge requisite for opening and working mines, as well as preparing ores for use. The latter consists, in the first place, in breaking in pieces the larger masses, and then freeing them, by means of water, from the earth which adheres to them; in the separation of the coarser substances from the finer, by means of a sieve that moves up and down in water; in the breaking of the ore in stamping mills, and in the separation of the finely interspersed metal from the stone or earth with which it is surrounded, &c. It also includes the final purification of the ore, by means of acids, by amalgamation, by fusion, &c. The annual produce of the mines of Great Britain has been estimated, from an average of years and prices, at—

			£
Silver	10,000	lbs. troy	30,000
Copper	13,000	tons	1,300,000
Tin	5,500	,,	550,000
Lead	46,000	,,	950,000
Iron	1,250,000	,,	10,000,000
Coal	32,000,000	,,	12,000,000
Salt, &c.			1,000,000
	Total		£25,830,000

All minerals are part of the freehold of the soil, except gold and silver, which are said to belong to the crown; but no mine of copper or lead is a royal mine, even though silver is extracted from it. Mines, except those of coal, are not rateable for the relief of the poor; a quarry is. The difference between a mine and a quarry is supposed to consist chiefly in the way of working.——MINE, in the Military art, denotes a subterraneous passage under a wall or fortification, for the purpose of blowing it up. The gunpowder in the mine was ignited by means of a pipe or hose, made of coarse cloth, called a *saucisson*, extending from the chamber to the entrance of the gallery: to the end of it was fixed a match, that the miner who set fire to it might have time to retire before the fire reached the *chamber*, or place where the powder was lodged. But galvanism affords a safe and certain means of exploding mines at any moment, however distant they may be. The conducting wire from a galvanic battery is made to pass through the powder, within which is a portion of wire so thin as to become red-hot, or even to ignite when the electric current is transmitted through it. This explodes the mine. The mines of a fortress are called *countermines*, the gallery of which runs under the covered way along the outer margin of the fosse.

MINERAL'OGY (*minéral*, a mineral: *Fr.*; and *logos*, a description: *Gr.*), that branch of natural history which makes us acquainted with the properties and relations of minerals, and teaches us to characterize, distinguish, and class them, according to these properties.

MIN'ERALS (*Fr.*), the general name for all inorganic substances found in the earth, including metals, metallic ores, salts, earths, and bituminous substances. Of these various substances, many are composed of such elements, and exhibit such peculiarities of constitution, that it is difficult to distinguish them without having recourse to analysis.

MIN'ERAL WA'TERS are of various kinds, but generally so far impregnated with foreign matter as to give them a sensible flavour and a specific action upon the animal economy. They are usually divided into four classes: acidulous or carbonated, saline, chalybeate or ferruginous, and sulphurous. The *saline* springs consist, in general, of salts of soda and lime, or of magnesia and lime, with carbonic acid and oxide of iron; such are those of Pyrmont, Seidlitz, Epsom, &c. The *ferruginous* waters have a decidedly styptic taste, and are turned black by an infusion of gallnuts; their iron is sometimes in the state of an oxide held in solution by carbonic acid; it sometimes exists as a sulphate, and sometimes both as a sulphate and carbonate: among them are the waters of Spa, Vichy, Cheltenham, Tunbridge, &c. The *acidulous* waters are characterized by an acid taste, and by the disengagement of carbonic acid: of this kind are the waters of Bath, Buxton, Bristol, &c. The *sulphurous* waters are easily recognized by their disagreeable smell, and their property of tarnishing silver and copper, which is a consequence of their containing sulphuretted hydrogen: of this class are the waters of Aix-la-Chapelle, Harrogate and numerous others. Some mineral springs are hot or *thermal*.—*Artificial* mineral waters are produced in the laboratory of the chemist, and are either merely imitations of the natural waters, or composed of different ingredients so as to form compounds valuable for medicinal purposes, but not known to exist in nature.

MIN'IM (*minimus*, the least: *Lat.*), in Music, a note equal to two crochets, or half a semibreve.——MINIM, the smallest liquid measure; generally considered as a drop. A fluid drachm contains 60 minims.

MIN'IMS (same *deriv.*, on the supposition that humility was to be their distinguishing characteristic), a religious order in the church of Rome, founded by Francis de Paula, towards the end of the 15th century.

MIN'IMUM (the least: *Lat.*), the least quantity assignable in a given case; opposed to *maximum*, which see.

MIN'ION (*mignon*, a favourite: *Fr.*), the name given to a small kind of printing type (two sizes larger than the type used for this volume).

MIN'ISTER (*Lat.*), the pastor of a church duly authorized to perform religious worship in public, to administer the sacraments, &c.——In Politics, one to whom a sovereign prince entrusts the administration of affairs; as, a *minister of state*, the *prime minister*, or a *foreign minister*. In Great Britain, the words *ministers* and *ministry* are used as collective names for the heads of departments in the state, but the subordinate members are not so designated. In their separate offices the cabinet ministers stand thus:—1. first lord of the treasury; 2. lord high chancellor; 3. chancellor of the exchequer; 4. lord president of the council; 5. lord privy seal. 6. secretary for the home department; 7. secretary for foreign affairs; 8. secretary for the colonies; 9. secretary for war; 10 secretary for India; 11. first lord of the admiralty; 12. president of the board of trade; 13. postmaster-general; 14. chancellor of the duchy of Lancaster; 15 chief secretary for Ireland; 16. president of the poor law board. It is the prime minister (who is generally the first lord of the treasury) that receives the sovereign's order to form a ministry, or in other words to appoint men of his own sentiments to fill the chief offices. Those of the ministry who are peers sit in the house of lords; the others sit in the house of commons, in virtue of being elected members, which is considered indispensable, unlike those in the United States, who cannot be either representatives or senators. The English ministers are always supposed to be ready, particularly on receiving due notice, to answer questions in parliament, on matters relating to their respective departments.——FOREIGN MINISTER, a person sent from one government to another, and accredited to the latter, in order to transact public business in the name of his government. The term is usually employed, instead of ambassador, to indicate the representative of minor sovereigns. [See AMBASSADOR and DIPLOMACY.]

MIN'IUM (*Lat.*), the red oxide of lead, obtained by exposing the protoxide of that metal to a great heat with free access of air.

MIN'NESÄNGERS (*Ger.*; from *minne*, love, and *sänger*, a singer), a name given to the German lyric poets of the middle ages, on account of love being the chief subject of their poems, the ancient German word *minne* being used to denote a pure and faithful love. After the fashion of the Provençal troubadours, the minnesängers engaged in poetical contests for the gratification of princes and ladies of the court. Some among them were poor, and earned their living by reciting their songs from court to court; but most of them sang merely for pleasure, when their swords were unemployed.

MIN'NOW, the name of a small fresh-water fish, the *Leuciscus phoxinus* of ichthyologists, one of the *Cyprinidæ*.

MI'NOR (less: *Lat.*), in Law, one who is under the age of twenty-one.——MINOR, in Logic, the second proposition of a regular syllogism.——MINOR, in Music, a term applied to those modes in which the third is three semitones above the key-note, and to intervals consisting of three semitones.

MINOR'ITY (last), in Law, a state of being under the age of twenty-one. Also the smaller number of persons who give their votes on any questions, particularly in parliament; opposed to *majority*.

MIN'STER (*Ger.*; from *monasterium*, a monastery: *Lat.*), a term anciently applied to the church of a convent. It is frequently found as a termination; thus Westminster, Leominster, &c.

MINT (*mynet*, money: *Sax.*), a place where the national coinage is stamped. The royal mint received its constitution of superior officers in the 18th year of Edward II. The contrivances used in it were long of a rude description, and it continued to carry on its operations within the Tower of London, until new buildings were erected for it on Tower Hill, in the early part of this century. The chief officers of the mint are, the master, deputy master, comptroller, king's assay-master, clerk of the papers, clerk of the irons, and superintendent of machinery, who constitute the *mint board*. The precious metal to be coined is first alloyed and then cast into small bars, which are passed through rollers in order to be reduced to the exact thickness required. The sheets are then subjected to the action of the punching machines, which cut out circular discs called blanks. These are separately tested for weight and soundness. After the rim has been raised they are taken to the coining presses, which mill the edges and stamp both sides at the same stroke, all the time feeding itself with blanks. One press will coin from 4000 to 5000 pieces in an hour. In forming the dies that impress the figures on the coin, a matrix is cut by the engraver on soft steel, and after this has been hardened it will strike many dies. The machines employed are of highly ingenious construction. [See COINING.]——MINT (*mentha*: *Lat.*), in Botany, a genus of herbaceous plants, whose roots are perennial. There are many species, all of which contain much essential oil, and have an agreeable odour

To the taste they are bitter, aromatic, and pungent. The *Mentha piperita*, or peppermint, is the most powerful, and, on this account, is most generally used in medicine. The *Mentha viridis*, or spearmint, is milder, and more commonly employed for culinary purposes.

MIN'UET (*Fr.*), a dance in slow time and with short measured steps, which requires great dignity and grace of carriage; it is now seldom used.

MIN'UTE (*minutus*, small: *Lat.*), the sixtieth part of the degree of a circle, and denoted thus ('), as a second or sixtieth part of a minute is by ("). Also, the sixtieth part of an hour. We often speak both of *minutes* and *moments* in order to convey a meaning of time indefinitely short.——**MINUTE**, in Architecture, usually denotes the sixtieth part of the diameter of a column, and is the subdivision by which the smaller parts of the order are measured.——**MINUTE** is also used for a short memoir or sketch of a subject, taken in writing, a note to preserve the memory of something.

MINU'TIÆ (*Lat.*), the smaller particulars, or minute details of anything.

MINX, the *Putorius Lutreola* of zoologists, an animal allied to the weasel, inhabiting the northern parts of Europe and America. It can swim and dive well, and is generally to be found on the banks of rivers, where it preys upon small fish, frogs, rats, mice, &c. Its fur is fine, but not very valuable. When irritated, the minx exhales a fœtid musky smell.

MI'OCENE (*meion*, less; *kainos*, new: *Gr.*), in Geology, a division of the tertiary series of strata, more modern than the Eocene, and less modern than the Pliocene. It has been subdivided into the upper series, which are wanting in our islands, and the lower series, which include the Hempstead beds of the Isle of Wight. The latter are 170 feet thick, and comprehend marine, estuary, and fresh-water deposits, abounding in shells and other fossils.

MI'RAGE (*Fr.*), an optical phenomenon, produced by refraction, and which consists in the unusual elevation or apparent approximation of coasts, mountains, ships, or other objects, accompanied by inverted images of the same. The appearance commonly presented is that of a double image of the object in the air; one being in the natural position, the other inverted, so as to resemble an object and its inverted image in the water. Mirage arises from the unequal refracting power of the lower strata of the atmosphere; and may be produced whenever the rays of light meet, in an oblique direction, the surface of a less refracting medium than that in which they were previously moving. They are thus turned back into the original medium in the same direction in which they would be impelled by a reflection taking place at the common surface of the two mediums. Most extraordinary forms of this phenomenon have been described by travellers.

MIR'ROR (*miroir*: *Fr.*), in Optics, the polished surface of any metal or silvered glass, which reflects the rays of light falling upon it, and presenting images of objects. Mirrors are either *flat*, as looking-glasses; *concave*, for the purpose of making the rays of light convergent; or *convex*, for the purpose of rendering them divergent. The objects viewed in convex mirrors are diminished, but are seen in an erect position, and appear to emanate from a point behind the mirror: this point is said to be a *negative* or *imaginary* focus, because the rays are not actually collected at it, as by a concave mirror, whose focus is called *real*. It is probable that brazen mirrors were the first kind used; but silver reflects the best, though it is too expensive a material for common use.

MISCH'NA, or **MIS'NA** (*shanach*, he repeated: *Heb.*), that part of the Jewish *Talmud* on which the *Gemara* is a commentary. It consists of traditions and explanations of Scripture. The Jews pretend, that when God gave the written law to Moses, he gave him also another, which was preserved by the doctors of the synagogue without committing it to writing, till, through their dispersion, they were in danger of departing from the traditions of their fathers: when it was judged proper to transfer it to books.

MISDEMEAN'OUR, in Law, a minor offence, or one of less magnitude than that which is designated a felony.

MISERE'RE (have mercy: *Lat.*), a title given to the 51st psalm, usually called the psalm of mercy, on account of the words with which it commences in the Latin version.

MIS'LETOE, or **MIST'LETOE** (*mistelta*, from *mistle*, birdlime; and *tan*, a twig: *Sax.*), the *Viscum album*, a parasitical plant found on the branches of many kinds of trees in the north of Europe. The misletoe was held sacred by the Druids, because they had an extraordinary reverence for the number *three*; and not only the berries, but the leaves of the misletoe, grow in clusters of three united on one stalk. Its growing upon the oak, their sacred tree, was doubtless another cause of its being venerated. When the end of the year approached, the Druids marched with great solemnity to gather the misletoe of the oak, in order to present it to Jupiter (Taranis), inviting all to assist them at this ceremony, with these words: 'The new year is at hand: gather the misletoe.' Until recently, it has not been found on the oak for many centuries.

MISNO'MER (*mis*, from *miss*: *Ger.*, wrongly done; and *nomen*, a name: *Lat.*), in Law, the misnaming a person, or mistaking his name. The Christian name should always be perfect, but the law is not so strict in regard to surnames, a small mistake in which will be overlooked. It has been observed that a mere misspelling is not a misnomer, if the name so spelled have the same sound as the real one. At present, no indictment or information is abated by any plea of *misnomer*: the court merely orders an amendment to be made.

MISPRIS'ION (*mépris*, negligence: *Fr.*) in Law, any high offence under the degree of what is capital, but bordering upon it.

——***Misprision of treason*** is a bare knowledge and concealment of treason, without participation in it. Misprisions are called *negative*, when they consist in the concealment of something that ought to be revealed; and *positive*, when they consist in the commission of something which ought not to be done.

MIS'SAL (*missale*, a mass-book: *Mod. Lat.*), in the Roman Catholic church, the book which contains the prayers and ceremonies of the mass. Some early missals are beautifully executed, and are objects of bibliomania.

MISTS (*Sax.*), or **FOGS**, are formed by particles of moisture densely congregrated in the air. [See CLOUDS, FOGS, &c.]

MITE (*miete: Ger.*), a name given to several minute animals which are placed by zoologists in the neighbourhood of spiders. The *Acarus domesticus*, or common cheese mite, is so small that it is scarcely visible to the naked eye, except by its motion.——**MITE**, in Commerce, a small coin formerly current, equal to about one third part of a farthing. The piece of money called, in Scripture, a *mite*, was the quarter of a denarius, or about seven English farthings.

MITHRA'IC, an epithet applied to anything connected with the Persian god *Mithras*, whose worship was introduced at Rome, where altars were raised to him, some of which are preserved in collections of antiquities. The god was usually represented, in sculptures, as a man plunging his dagger into the neck of a prostrate bull, upon which he has placed his knee, whilst he holds a horn in one of his hands.

MITH'RIDATE, a celebrated medical confection, whose active ingredient was opium: invented by Democrates, physician to Mithridates, king of Pontus. It was supposed to be an antidote against the effects of all poison and contagion.

MI'TRA (*mitra*, a headband: *Gr.*), in Antiquity, a cap or covering for the head, worn by the Roman ladies, and sometimes by the men, but it was looked upon as a mark of effeminacy in the latter, especially when it was tied upon their heads. Amongst the Greeks, the *mitra* was a girdle worn below the cuirass, to defend from missiles.——**MITRA**, a genus of marine univalve shells.

MI'TRAL VALVES (from being like *mitres* in shape), in Anatomy, two valves situated in the left ventricle of the heart, at the ingress of the pulmonary vein, serving to hinder the return of the blood from the heart into the veins.

MI'TRE (*mitra*, a headband: *Gr.*), an ornament worn on the head by bishops and certain abbots on solemn occasions; being a sort of cap, pointed, and cleft at top. The high-priest among the Jews wore a mitre or bonnet on his head. The inferior priests had likewise their mitres, but in what particulars they differed from that of the high priest is at this time uncertain. Some writers contend that the ancient bishops wore mitres; but there is no mention of the mitre as an episcopal ornament before A.D. 1000. It is scarcely ever worn by the bishops of the established church, though it forms part of their coats of arms.

MIT'TIMUS (we send: *Lat.*), in Law, a writ for transferring records from one court to another. Also a precept or command in writing, under the hand and seal of a justice of the peace, or other proper officer, directed to the gaoler or keeper of a prison, for the receiving and safe keeping of an offender charged with any crime, until delivered by due course of law.

MIXED FE'VER, one that is intermediate between an inflammatory, or low fever, and a typhus fever.

MIX'TURE (*mixtura*: *Lat.*), in Pharmacy, a liquid medicine which contains not only extracts, salts, and other substances soluble in water, but powders, &c., which are insoluble.

MIZ'EN MAST (*mezaen*: *Dut.*), the mast, next the stern, which supports the after sails.

MNEMON'ICS (*mnēmonikos*, belonging to memory: *Gr.*), a systematic method of communicating assistance to the memory.

MOAT (*motte*, a mound: *Fr.*), in Fortification, a deep trench or ditch, dug round the ramparts of a fortified place, to prevent surprises. The brink of the moat next the rampart is called the *scarp*; and the opposite one, the *counterscarp*.

MO'CHA-STONE, in Mineralogy, *dendritic agate*; a mineral, in the interior of which appear delineations of shrubs which are destitute of leaves, and are either of a brown, black, or green colour. In some cases these may have been produced by the filtration of the oxides of iron and manganese.

MOCK'ING-BIRD, the *Mimus polyglottus*, or mocking thrush, a dentirostral passerine bird. It builds its nest in trees near the dwellings of man, and feeds upon fruits. Although this bird is inferior to most of the feathered tribe in America in brilliancy of plumage, it is much sought for on account of its wonderful imitative powers. Its own natural song is bold, full, and exceedingly varied; but in addition to the fulness and melody of its original notes, it has the faculty of imitating those of all other birds from the humming-bird to the eagle. In measure and accent it faithfully follows its originals, while in force and sweetness of expression it greatly improves upon them. A bystander might suppose that the whole of the feathered tribes had assembled together in a trial of skill, each striving to produce its utmost effect, so perfect are the mocking-bird's imitations.

MODE (*modus*, a manner: *Lat.*), in Metaphysics, the manner of a thing's existence, which is either simple or mixed. *Simple* modes are only repetitions of the same simple idea; thus, by adding units together, in distinct separate collections, we come by all the several modes of numbers, as a *dozen*, a *score*, a *thousand*, &c. *Mixed* modes, on the contrary, are compounded of simple ideas of different kinds, as *beauty*, which consists in a certain composition of colour and figure, causing delight in the beholder. ——*Essential*, or *inseparable modes*, are attributes without which the substance cannot subsist.——*Non-essential*, or *separable modes*, are attributes affecting created substances, and affixed to them in certain circumstances, as coldness in water, &c.——**Mode**, in Music, a regular disposition of the piece in relation to certain principal sounds, which are called the *essential chords* of the bass, or the essential sounds of the *mode*. The difference between a mode and a key is, that the octave is called a *mode* with regard to the manner of dividing it, but a *key* with regard to its pitch or place in the scale.——The word *mode* is applicable also to particular acts, or a series of acts, or to the common usage of a place or people.

MOD'EL (*modulus*, a measure of anything: *Lat.*), an original pattern, or the shape or design of anything in miniature. The term is particularly applied to an artificial pattern, made in wood, stone, plaster, or other material, which is intended to secure the more accurate execution of some great work, and to afford an idea of the effect to be produced. Living models, for the purpose of studying the play of the muscles, the varieties of expression, and the relative proportions of the human form, are provided in all academies for painting.

MODERA'TOR (*Lat.*), a person who presides at a public assembly, to propose questions, preserve order, and regulate the proceedings. Thus the president of the annual assembly of the church of Scotland is styled the *moderator*.

MODIFICA'TION (*modificatio*: from *modus*, a state; and *facio*, I make: *Lat.*), in Philosophy, a change in the state of anything. Quantity and quality are accidents which modify all material substances. According to Spinosa's system, all the beings that compose the universe are only so many different modifications of one and the same element: and it is the different arrangement and situation of their parts that make all the difference between them.

MODIL'LION (*modiglione*: *Ital.*), in Architecture, an ornament in the cornice of the Ionic, Corinthian, and Composite orders, a sort of bracket serving to support the projection of the larmier or drip.

MO'DIUS (*Lat.*), a Roman dry measure for all sorts of grain, containing 32 *heminæ* or 16 *sextarii*, or one-third of the *amphora*, amounting to an English peck.

MO'DO ET FOR'MA (in the manner and form: *Lat.*), in Law, words frequently used in pleadings, &c., and particularly in a defendant's answer, in which he denies having done what is laid to his charge, as affirmed by the plaintiff.

MODULA'TION (*modulatio*, from *modulor*, I modulate: *Lat.*), in Music, the art of composing in accordance with the laws prescribed by any particular key, or of changing the mode or key. Also the regular progression of several parts through the sounds that are in the harmony of any particular key, as well as the proceeding naturally and regularly from one key to another.

MOD'ULE (*modulus*, the *dim.* of *modus*, a measure: *Lat.*), a measure applied in architecture; it consists of a semidiameter of the column, and is divided into 30 minutes.

MO'DUS (*Lat.*), an equivalent in money, or other valuable consideration, given to the minister or vicar by the owners of land in lieu of tithes. The whole phrase is *modus decimandi*, though *modus* alone is generally used.

MO'DUS OPERAN'DI, a Latin phrase, signifying the way or method in which an operation or performance of any kind is effected.

MOGUL', GREAT, the chief of an empire founded in Hindostan, by Baber, in the 15th century. The last legitimate sovereign bearing this title was Shah Allum; and the empire terminating at his death in 1806, nearly all his immense possessions fell into the hands of the East India Company.

MO'HAIR (*moire*: *Fr.*), the hair of a goat, *Capra angorensis*, which inhabits the mountains in the vicinity of Angora in Asia Minor. It is white and silky, forming long curls on the animal. There is a considerable importation of it into this country, where it is manufactured into various articles, mixed with other fibres.

MO'HAIR-SHELL, in Conchology, a peculiar species of *Voluta*, resembling on the surface mohair, or a close web of the silkworm.

MOHAM'MEDANS. [See **Mahometans**.]

MO'HUR, an East Indian gold coin. The mohur of Bengal is worth 1*l.* 13*s.* 8*d.*, that of Bombay 1*l.* 10*s.* 1*d.*

MOI'DORE, a Portuguese coin, equal to 27*s.* sterling.

MO'IETY (*moitié*: *Fr.*), a half part; a term frequently used by lawyers.

MOLA'RES (*Lat.*, from *mola*, a mill), or **Dentes Molares**, *Molar teeth*, in Anatomy, the large teeth, sometimes called grinders. In man they are distinguished as pre-molars and true or permanent molars. The first are two in number, at each side of each jaw. They are next the canine teeth, and are changed by children like the front teeth. The true molars are not changed; there are three on each side of each jaw.——**Molar Glands**, two salivary glands, situated on each side of the mouth.

MOLE (*moles*: *Lat.*), a mound or massive work, formed of large stones laid in the sea by means of coffer-dams, &c., extended in a right line, or as an arc of a circle, before a port, which it serves to defend from the violence of the waves; thus protecting ships in a harbour. The word is sometimes used for the harbour itself. Among the Romans, a kind of mausoleum, built like a round tower on a square base, insulated, encompassed with columns, and covered with a dome. Thus, the *Moles Hadriani*, now the Castle of St. Angelo, at Rome.——**Mole**, a spot or mark on the skin, or a small excrescence of the cuticle.——**Mole** (*mæl*: *Sax.*), in Zoology, the *Talpa Europæa*, a small animal, from five to six inches in length, which, in search of worms or other insects, forms a road just under the surface of the ground, raising the soil into a little ridge. Its conformation enables it to burrow with great ease, and such rapidity that its passage through the earth has been compared to swimming. It has no external ears, and its eyes are so minute, and so concealed by its fur, as to have given rise to a belief that it is formed without these im-

MOUN'TAINS. The principal mountain chains of the globe are the Andes, in South America, with a length of 4500 miles; the Stony mountains, in North America, 7000 miles long; the Altai chain, in Asia, 5000 miles long; the Himalayan chain, 1900 miles long; and the Ural mountains, which divide Asia and Europe, 1500 miles long. The altitude of the highest mountains bears a very inconsiderable proportion to the mass of the globe; and its spherical form is very slightly altered by all the chains and groups which mark its surface. The highest Asiatic mountain is Deodunga, in the Nepal Himalayas, 29,000 feet; the highest South American mountain is the Nevado de Sorata, in the Bolivian Andes, 25,000 feet; the highest mountain in North America is the volcano of Popocatepetl, in Mexico, 17,717 feet; the highest elevation in Africa is Geesh, in Abyssinia, 15,000 feet; whilst the highest European mountain is Mont Blanc, 15,739 feet. Ben Nevis, in Inverness-shire, is the loftiest summit in the British Islands, 4380 feet. The greatest heights to which men have ascended on mountains appear to be, 19,400 feet on Chimborazo by Humboldt, and 19,000 feet in the Sikkim Himalaya by Dr J D Hooker. It must not be assumed that mountain chains have been thrown up by a few paroxysmal efforts; on the contrary, several of them afford evidence that their upheaval was a slow process, the rise, *en masse*, being assisted and accompanied by the injection and ejection of melted matter. The changing character of the vegetation as we ascend mountains is well known. Humboldt has painted the effect of the increasing rarity of the air and cold upon plants on the slopes of the Andes On leaving the burning plains, where palms, bananas, and other tropical plants luxuriate, he entered the region of forest trees and tree ferns, and then passed into that where shrubs abounded In the stormy regions above, grasses alone flourished, and higher still the rocks were bare of all save lichens, until the line of perpetual snow was reached, and all vegetation terminated.

MOUNT'ING, in the Mechanic Arts, anything that serves to raise or set off a work. ——**Mounting**, in Military affairs, signifies going upon a duty; thus, *mounting a breach* is running up to it, and *mounting guard* is going upon guard, but *mounting a cannon, mortar*, &c., is the setting it properly on its carriage.

MOURN'ING (*murnan*, to mourn: *Sax*). The colours used as badges of grief are different in different countries. In Europe, the ordinary colour for mourning is black; in China, as with the ancient Spartan and Roman ladies, it is white; in Turkey, it is blue or violet; in Egypt, yellow; in Ethiopia, grey. The kings of France and cardinals mourn in purple. Some have attempted to trace the associations which caused the adoption of the various colours to natural causes. Thus black, which is the privation of light, is supposed very appropriately to denote the privation of life; white is an emblem of purity; yellow is the colour of leaves when they fall, and represents that death is the end of all human hopes, &c. In the East, to cut the hair was considered a sign of mourning; among the Romans, on the contrary, it was deemed a mark of sorrow to let it grow. The duration of mourning varies in different countries, being always longer in proportion to the nearness of relationship. Among the ancients, as among the moderns, public mournings were common on the death of a distinguished public benefactor; and with the Greeks and Romans it was the custom, during the term prescribed for mourning, to lay aside all ornaments of dress, to abstain from the bath and other indulgences

MOUSE (*mus: Gr.;* from *mush*, to filch. *Sansk.*), a small animal belonging to the rodent genus *Mus*, which also includes the rats. The species of mice are very numerous, and are found all over the globe.

MOUTH (*muth: Sax.*), in Anatomy, a cavity or aperture in the head of any animal, by which the food is received, the voice uttered, and the inspiration or expiration of the air is performed. It consists of the lips, the gums, the insides of the cheeks, the palate, the salivary glands, the uvula, and tonsils.——In Architecture, the same as *cavetto*.

MO'VEMENT (*mouvement: Fr.*), in Horology, the train of wheelwork of a clock or watch ——In Military affairs, the regular orderly motion of an army for some particular purpose.——In Music, the progress of sounds from grave to acute, or from acute to grave

MU'CIC A'CID, in Chemistry, the same as *Saclactic Acid*, so called because obtained from sugar of milk; but all the gums equally afford it.

MU'CILAGE (*Fr.*), in Chemistry, a viscous substance of more or less consistence; as, a solution of gum, or any tenacious liquid ——**Mucilaginous Glands**, in Anatomy, glandules or kernels about the joints, that secrete a mucilaginous liquor, which serves to lubricate many of the internal cavities, some are small, some crowded together.

MU'COUS MEM'BRANE (*mucosus*, slimy: *Lat.*), the membranous lining of the canals and cavities of the body, which have an external opening. It answers to, and is a continuation of, the external skin of the body. It consists of four layers, the innermost of which in some parts bears cilia.

MU'CRO COR'DIS (the point of the heart: *Lat.*), in Anatomy, the lower pointed end of the heart.

MU'CRONATE (*mucronatus*, sharp-pointed: *Lat.*), in Botany, an epithet for a sharp-pointed leaf terminating like a dagger.

MU'CUS (*Lat.*), a fluid in the animal body, secreted by the mucous membrane, and best exemplified by that from the nasal membrane. It covers the lining membranes of all the cavities which open externally, such as those of the mouth, nose, lungs, intestinal canal, urinary passages, &c., serving to moisten and defend them. It is viscid; apparently becomes fluid in water, but is not dissolved by it. It may be repeatedly dried and moistened without sensibly changing its properties. When boiled in water it becomes tough, but on cooling regains its former condition; less than one per cent. of it gives a ropiness to water. It is said to consist of the scales of the *epithelium*, or cuticle, which continually wear off, and mix with a watery secretion. ——MUCOUS FEVER, a term frequently used by medical writers to express those fevers in which nature is endeavouring to rid herself of an abundance of pituitous, mucous, and serous matter. Catarrhal fevers of all kinds are comprehended under the term.

MUEZ'ZIN, or MUED'DIN, among the Mahometans, the crier who announces the hours of prayer from the minaret, and reminds the faithful of their duty.

MUF'TI (*Turk.*), a doctor of the law of the Koran. The mufti of Constantinople, or Sheikh-ul-Islam, is the chief functionary of the Turkish church, and represents the sultan in spiritual matters, as the grand vizier does in temporal. He decides in all doubtful questions of their law.

MUGGLETO'NIANS, a religious sect, which arose in England about the year 1561. They were so denominated from their leader, Ludowic Muggleton, a tailor, who, with his associate Reeves, asserted that they were the two last witnesses of God mentioned in the Revelations.

MULAT'TO (*Span.*; from *mulus*, a mule: *Lat.*), the offspring of a European and a negro. The mulatto is of a deep tawny or yellow colour, with frizzled or woolly hair, but resembles the European more than the African. The offspring of a white and mulatto is called a *quadroon;* of a white and quadroon, a *muster;* of a white and muster, a *mustafina;* after which, they are said to be whitewashed, and are considered Europeans. The offspring of a mulatto and negro is called a *cabre;* of a cabre and negro, a *griffe;* after which, generally speaking, there is no distinction but negro. The descendants of Europeans and American Indians are called *mestizos* in Spanish America. In Brazil they are termed *Mamelucos*. In some parts of South America, the term *Creole* is applied to the offspring of negroes; in others, to those persons who are born in the country of Spanish parents.

MUL'BERRY (*maulberre: Ger.*), the fruit of trees belonging to the genus *Morus*, nat. ord. *Moraceæ*. The *Morus nigra* has been introduced into Britain from Italy, and is cultivated on account of its fruit, the common black mulberry. The white mulberry (*Morus alba*) is cultivated in France and Italy for its leaves, which are the food of silkworms. The red mulberry (*Morus rubra*) is one of the most valuable of American trees, from the properties of the wood. It grows to the height of sixty feet and upwards, with a trunk six feet in circumference. The wood is fine-grained, compact, strong, and solid; and is used for knees, floor-timbers, &c., in ships, as well as for many other purposes where strength and durability are necessary.

MULCH (*muld*, dust: *Goth.*), a term used by gardeners for rotten dung, or the like, thrown upon beds of young plants, to preserve them from the ill effects of cold or drought.

MULE (*mulus: Lat.*), a hybrid animal, usually generated between an ass and a mare, and sometimes between a horse and a she-ass; but the latter is every way inferior to the former. Mules are hardy, sure-footed animals, and, in the mountainous parts of Spain and Italy, are far more useful than horses, being capable of carrying equally heavy burdens, and enduring long-continued fatigue. Mules have been much employed, both in ancient and modern times. The Roman ladies had equipages drawn by mules; and at this day, in Spain, they are generally used with the coaches of the nobility.——The term is sometimes applied also to other hybrids, besides those produced between the horse and the ass. ——MULE, in Manufactures, the name given to a contrivance, invented by Crompton about the year 1777, for producing finer yarn than was spun by the machines previously in use. At present, the *mule* is employed in the fabrication of the most delicate articles; thread has been produced by it of such fineness that what was made from a pound of cotton has been sufficient to reach 167 miles.

MUL'LER (*mouleur: Fr.*), a stone held in the hand, and used by painters and apothecaries for grinding colours, &c., on another stone.

MUL'LET (*mullus: Lat.*), a name given to fishes belonging to two ichthyological genera, the grey mullet (*Mugil*), and the red mullet (*Mullus*). Red mullets were held in such estimation by Roman epicures that they were sometimes sold for their weight in silver. It is recorded that 240*l.* were paid for three fishes, of unusual size, by a Roman epicure. The roes are known in Italy under the name of *botargo* ——MULLET (*molette*, the rowel of a spur: *Fr.*), in Heraldry, a star-shaped ornament, added to the family arms by the third of the junior branches.

MUL'LION (*moulure*, a moulding: *Fr.*), in Architecture, the post, or bar, dividing the lights in a window. Vertical mullions are termed *munnions;* those which are horizontal, *transoms*.

MULTILAT'ERAL (*multus*, many; and *latus*, a side: *Lat.*), polygonal; in Geometry, a term applied to those figures which have more than four sides and angles.

MULTILOC'ULAR (*multus*, many; and *loculus*, a compartment: *Lat.*), in Botany, having many cells; as, a multilocular pericarp.

MULTINO'MIAL (*multus*, many; and *nomen*, a name: *Lat.*), in Mathematics, a term applied to such roots as are composed of many names, parts, or members.

MUL'TIPLE (*multiplex*, manifold: *Lat.*), in Arithmetic, a number which contains some other, called its measure, more than once: thus 6 is a multiple of 2, containing it thrice, and 12 is a multiple of 6, 4, and 3, containing the first twice, the second thrice, &c.——MULTIPLE RATIO or PROPORTION, that which exists between multiples. If the less term be an aliquot part of the greater, the ratio of the greater to the less is called a *multiple* ratio; and that of the less to the greater a *sub-multiple* an arithmetical operation by which is found the sum of one number (the multiplicand) taken as many times as there are units in another (the multiplier); thus 10 multiplied by 5 is increased to 50. The result of the operation is the *product*.——CROSS MULTIPLICATION, otherwise called duodecimal arithmetic, an expeditious method of multiplying things of several species or denominations, by others likewise of several species, &c. [See DUODECIMALS.]

MUL'TIPLYING GLASS, in Optics, a glass with several plane sides, each of which presents a separate picture of an object. Its effect is due to the rays of light, which issue from the same point, undergoing different refractions, so as to enter the eye from every surface in a different direction.

MUL'TIVALVE (*multus*, many; and *valvæ*, the leaves of a door: *Lat.*) in Conchology, a term sometimes applied to those shells that consist of more parts than two, such as the Chitons and the Pholades. The multivalves do not form a natural division of molluscs.

MUL'TURE (*moulture : Fr.;* from *molo*, I grind: *Lat.*), in Scotch Law, the payment given to the proprietor of a mill for grinding corn.

MUM (*mumme: Ger.*), a malt liquor much used in Germany. It is made of the malt of wheat, with a small proportion of oatmeal and ground beans.

MU'MIA (*Arab;* from *mum*, wax), in Mineralogy, a sort of bitumen or mineral pitch, which is soft and tough, like shoemaker's wax, when the weather is warm, but brittle, like pitch, in cold weather. It is found in Persia, where it is highly valued.

MUM'MY (last), a dead body preserved by antiseptics, according to methods practised by the ancient Egyptians. The processes for this purpose were very various: some of the mummies which have been opened having been dried by vegetable and balsamic substances, others by salt or natron. In the former case, aromatic gums or asphaltum were used; and those so treated are generally in good preservation. Those dried with saline substances are of a black, hard, smooth appearance; on exposure to the air they attract moisture, and become covered with a saline substance. The bodies are rolled up in bandages of silk and linen, which are sometimes 1000 yards in length. The coffin is usually of sycamore, cedar, or pasteboard; the case is in one piece, covered within and without by paintings, representing funeral scenes, and a great variety of other subjects: the cover, which is also in one piece, is ornamented in the same manner, and contains, also, the face of the deceased in relief, painted, and often gilded. The Egyptians embalmed, not only the human species, but all the animals held sacred by their religion. We are not to imagine that Egypt was the only place in which the preservation of the bodies of the dead was attended to. In every country the custom of embalming has been occasionally practised; a large number of mummies have been discovered in the environs of Durango, in Mexico. They are in a sitting posture, but have the same wrappings, bands, and ornaments as the Egyptian. In the British Museum considerable space is allotted to the Egyptian mummies. There are some mummies produced naturally, by the peculiar conditions of the soil and atmosphere, which dry the animal tissues so rapidly, that the body is preserved from putrefaction.

MUMPS (*mumpelen*, to nibble: *Dut.*), the common name of the disease called by medical practitioners *Cynanche parotidea*, or a swelling of the parotid glands. It seems, occasionally, to be the effect of cold, and children are more subject to it than adults. It is often epidemic, and by some is thought contagious.

MUN'DIC (*mwndig*, from *mwn*, a mine: *Wel.*), in Mineralogy, a Cornish name for *iron pyrites*.

MUNICIP'AL (*municipalis*, belonging to a town: *Lat.*), in the Roman civil law, an epithet which signifies invested with the rights and privileges of Roman citizens. Thus the municipal cities were those whose inhabitants were capable of enjoying civil offices in the city of Rome; though the greater part of them had no suffrages or votes there.——In modern times, *Municipal law* relates to the citizens and inhabitants of a state, and is thus distinguished from *political* law, *commercial* law, and the *law of nations*. *Municipal officers* are those elected in cities and boroughs, under the Municipal Corporation Reform Act, for the purposes of local government.

MU'NIMENTS (*munimentum*, a defence: *Lat.*), in Law, the writings relating to a person's inheritance, by which he is enabled to defend his title to his estate; or, in a more general sense, all manner of evidences, such as charters, feoffments, releases, &c., but more especially those belonging to public bodies.——MUNIMENT ROOM, a small strong room in a cathedral, college, or university, destined for keeping the seal, charters, &c.

MUNI'TION (*munitio: Lat.*), the provisions with which a place is furnished in order for defence; or that which follows a camp for its subsistence.——MUNITION SHIPS are those that have naval or military stores on board, and attend or follow a fleet to supply ships of war.

MUN'JEET, a species of madder, produced in various parts of India, and used in dyeing: the red which it produces being nearly the same as that produced from European madder.

MU'RAL ARCH (*muralis*, belonging to a wall: *Lat.*), the segment of a large circle, fixed in the meridian against the wall of an observatory, for measuring the meridian altitudes, or zenith distances, of heavenly bodies.

MU'RAL CIR'CLE (same *deriv.*), or MURAL QUADRANT, in Astronomy, a large instrument, fixed in the meridian, for the purpose of measuring the distances of stars from the pole or zenith. It is attached to a stone wall or pier of solid masonry. As its purpose is to measure angular distances in the meridian, its axis must be truly horizontal; also the plane of its circle vertical and in the meridian; the line of sight must be at right angles to the axis, and parallel to the plane of the circle. Entire circles are susceptible of more accurate division than quadrants, and are much less liable to derangement. Troughton's, in Greenwich observatory, is six feet in diameter; it was placed there in 1812, and has shown that a good mural circle is the most important instrument in an observatory.

MURA'LIS CORO'NA (a mural crown: *Lat.*), among the ancient Romans, a crown, consisting of a circlet of gold, indented and embattled, bestowed on him who first mounted the wall of a besieged place, and there planted a standard.

MUR'DER (*meurtre: Fr.*), in Law, the wilful and felonious killing a person from premeditated malice; provided the party wounded or otherwise hurt die within a year and a day after the crime is committed. To constitute murder in law, the person killing another must be of sound mind, and the act must be done with malice prepense and aforethought; but malice may be implied as well as expressed.

MU'REX (*Lat.*), a genus of univalve molluscs, from some species of which the ancients obtained a purple dye. The animals feed on other molluscs. About 200 species are known, some of which are curiously spined. *Murex tenuispina* is a shell of this kind, well known to collectors.

MU'RIACITE, an anhydrous sulphate of lime, containing a little common salt.

MU'RIATES, in Chemistry, salts composed of what was formerly called muriatic acid, but now termed hydrochloric acid, and a base. The salts are called chlorides, that is, combinations of chlorine, the radicle of the acid, with the metallic or other bases of the oxides; water being formed, during the combination, by the union of the hydrogen of the muriatic acid with the oxygen of the oxide. Common salt (chloride of sodium) is the most abundant of these compounds, which from it are termed *haloid* (*hals*, the sea; and *eidos*, form: *Gr.*).

MURIAT'IC A'CID (*muria*, brine: *Lat.*), called also, and more correctly, *hydrochloric acid*, is a combination of hydrogen and chlorine. It is the *spirit of salt* of the shops, and is obtained by acting on common salt with strong sulphuric acid. Water is decomposed; its hydrogen goes to the chlorine of the chloride, and forms hydrochloric acid; and its oxygen goes to the sodium, forming soda, which, combining with the sulphuric acid, forms sulphate or bisulphate of soda. Muriatic acid is a gas, without colour, but of a penetrating taste and smell; it does not support combustion, is intensely sour, and is absorbed in large quantities by water, unless that fluid is hot, or is saturated with common salt. It is liquefied by a pressure of about 40 atmospheres, that is, a pressure of 600 lbs. to the square inch. The ordinary muriatic acid is a strong solution of this gas in water, which may be made to contain 480 volumes of it; or, in other words, one cubic inch of water will absorb 480 cubic inches of the gaseous acid.

MU'RICATED (*muricatus*, pointed: *Lat.*), in Botany, having the surface covered with short hard excrescences.

MUR'RAIN (*Fr.*), the popular name of a malignant epizootic influenza, to which cattle are subject, and which sometimes makes great havoc among them. It appears in the form of an extremely inflammatory œdema, generally confining itself to one of the hind quarters of the animal. It is most common in spring and autumn, and usually attacks young cows. The side affected becomes discoloured and swollen; there is lameness and inability to move, a peculiar emphysema over different parts of the body, but particularly the spine; and all the symptoms of putrid fever which usually appear in diseases of a typhoid character, manifest themselves. Gangrene speedily supervenes, and few animals survive more than ten or twelve hours. It is known by different names in different places. Abundance of fresh air, with plentiful fumigation by means of chlorine or chloride of lime, and the immediate removal of the infected, are the best preservatives against it.

MURR'HINE VA'SES (*murrhina vasa*: from *murrha*, the material of which they were made—supposed to be fluor spar: *Lat.*), splendid antique vessels, made of a material the nature of which is not certainly known, and equally distinguished for the beauty of their execution and the costliness of their material. They were brought by Pompey from Asia to Rome, after his victory over Mithridates, and were of great value.

MUS (a mouse: *Lat.*), in Zoology, a genus of rodent animals comprehending the rats and mice.

MUSA'CEÆ, in Botany, a nat. ord. of endogenous plants, natives of warm countries, containing five genera, *Strelitzia* and *Heliconia*; two of these genera have remarkably handsome flowers. The Traveller's Tree, a splendid palm-like plant, belongs to the genus *Ravenala*. To the genus *Musa* belong the BANANAS and PLANTAINS. All the species abound with a strong fibre; that of *Musa textilis* forms Manilla hemp.

MUS'CA (a fly: *Lat.*), in Entomology, a genus of dipterous insects.——MUSCA INDICA, in Astronomy, a southern constellation.

MUS'CADINE, MUS'CADEL, MUSCATEL', or MUSCAT' (*muscadin: Fr.*; from *musca*, a fly: *Lat.*—because flies are very fond of the grape), a rich kind of wine, the produce of a peculiar variety of grape, the growth of Italy and the south of France.

MUS'CÆ VOLITAN'TES (flies flitting about: *Lat.*), certain dark spots, which seem to flit before the eyes of many people on looking at the sky, a candle, or other bright object; and so called from their resembling flies.

MUS'CLE (*musculus: Lat.*). What we call flesh is for the most part composed of muscle. It consists of bundles of fibres, united by areolar or cellular tissue. When torn into its ultimate fibres, there are found to be two kinds, one termed organic or unstriped muscle, the other voluntary or striped muscle. The former consists of solid elongated fibres, thicker in the middle than at the ends. The latter is composed of slender fibrillæ, each inclosed in a sheath, and marked transversely by alternate light and dark spaces. On closer examination with the microscope, a fibrilla is seen to consist of a number of cells placed end to end, each of them containing a cavity filled with some highly refracting substance. When the fibril is in a state of contraction, the dark space presents a nearly square shape; but in the ordinary state of relaxation, the dark spaces are longer than wide. The two kinds of fibrils have the same chemical composition. The diameter of these fibrils differs greatly in the muscle of different animals. Nerves, blood-vessels, and other vascular tissue, ramify amongst, and are supported by, the muscular tissue.——*Muscular motion* is of three kinds, voluntary, involuntary, and mixed. The *voluntary motions* of muscles proceed from an exertion of the will; thus the mind directs the arm to be raised or depressed, the knee to be bent, the tongue to move, &c. The *involuntary motions* of muscles are performed by organs, without any attention of the mind, as the contraction and dilatation of the heart, arteries, veins, absorbents, stomach, intestines, &c. The *mixed motions* are those which are in part under the control of the will, but which ordinarily act without our being conscious of their acting; and are perceived in the muscles of respiration, the intercostal and abdominal muscles, and the diaphragm. When a muscle acts, it becomes shorter and thicker; both its origin and insertion are drawn towards its middle. When a muscle is wounded or otherwise irritated, it contracts independently of the will; this power is called *irritability*, and it is a property peculiar to, and inherent in, the muscles. If the nerve belonging to a muscle is cut, the powers of the muscle are first disturbed, and then cease; but if electricity be transmitted through the nerve before rigidity supervenes, the action of the muscle will, to a certain extent, be recalled; and hence the nervous fluid and electricity are supposed to be identical. The intensity of muscular contraction, that is, the degree of power with which the fibres draw themselves together, is regulated by the action of the brain. Muscles consist of fibrine with some albumen, and the gelatine and fat derived from the cellular membrane; also hæmatosine, osmazone, and the other constituents of the blood: hence they constitute the most nutritious species of animal food.

MUSCOVA'DO, unrefined sugar, or the raw material from which loaf sugar is procured by refining. Muscovado is obtained from the juice of the sugar-cane by evaporation and draining off the liquid part called *molasses*.

MU'SES (*musæ: Lat.*), in the poetry of the ancients, personifications of the various branches of knowledge in which human genius displays itself. They were beautifully said to be the daughters of Jove and Mnemosyne, or Memory; and they were represented as companions of Apollo upon Parnassus. They were said to be nine, namely:—Clio, to whom was attributed the invention of history; Melpomene, the inventor of tragedy; Thalia, of comedy; Euterpe, of the use of the flute; Terpsichore, of the harp; Erato, of the lyre and lute; Calliope, of heroic verse; Urania, of astrology; and Polyhymnia, of rhetoric.

MUSE'UM (*mouseion*, literally a seat of the muses: *Gr.*), a place set apart as a repository for curious, valuable, and interesting objects connected with the arts and sciences, more especially such as relate to natural history. The term was originally applied to a study, or a place devoted to learned men, in the royal palace of Alexandria, by Ptolemy Philadelphus, who founded a college, and gave salaries to the several members, adding also an extensive library, which was one of the most celebrated in the world.——The British Museum in London is a very extensive and magnificent building, and the noblest collection of curiosities in the world. In the year 1753, parliament having passed an act for purchasing the museum of Sir Hans Sloane, and the collection of manuscripts of Lord Oxford, called the Harleian Library, for the use of the public, twenty-six trustees were appointed and incorporated to provide a repository for these and some other collections, which repository was to be called the British Museum. The collections were placed originally in Montague House, the residence of the Dukes of Montague in Bloomsbury. Since that time vast gifts and purchases have been made, in every department of science, literature, and art. The old ducal mansion has been replaced by noble buildings, and the convenience of the public has been studied in every possible way; so that for extent and usefulness it is altogether unrivalled. It is rich in natural history, particularly in mineralogy. It possesses the marbles brought by Lord Elgin from Greece, the Townley marbles, a magnificent collection of Egyptian antiquities, with those brought from Nineveh; also the Hamilton and Portland vases, &c. Its library contains a vast number of books and manuscripts. [See LIBRARY.] Its new reading-room is the finest and most convenient structure of the kind in the world, being a rotunda of 140 feet in diameter, 106 in height, and capable of accommodating 300 readers in the most perfect manner.——The museum of the Vatican is the most celebrated in Italy; that of Florence is considered the next; after which is the Museo Borbonico at Naples. On the continent, galleries of pictures are termed museums (*musées*); and, as such, that of the Louvre ranks very high.

MUSH'ROOM (*mousseron: Fr.*), the popular name of some edible cryptogamic plants of a soft structure. They belong to the order of fungi. Since many *fungi*, closely resembling mushrooms in appearance, are of a poisonous quality, the greatest caution should be used by those who provide them. If a mushroom have an offensive smell, a bitter, astringent, or styptic taste, or is even of unpleasant flavour, it is certainly unfit for food. Colour, figure, and texture cannot be relied on; but the pale or sulphur yellow, bright or blood red, and the greenish, are generally poisonous. The safe kinds have mostly a compact brittle texture; the flesh is white; and they grow more readily in open places than in damp or shady spots. The mushrooms used in sauces are the *Agaricus campestris* and the *A. arvensis*. It is singular that the former species is considered pernicious in Italy.

MU'SIC (*mousikē: Gr.*), the science of sounds, considered as capable of producing melody, and agreeably affecting the mind by a due disposition, combination, and proportion. It treats of the number, time, division, succession, and combination of sounds. It is divided into *theoretical* music, which inquires into the properties of concords and discords, and explains their combinations and proportions for the production of melody and harmony; and *practical* music, which is the art of applying the theory of music in the composition of all sorts of pieces, tunes, and airs. Music is also either vocal or instrumental. *Vocal* music is the melody of a single voice, or the harmony of two or more voices in concert; *instrumental* music is that produced by one or more instruments. Every musical production ought to be expressive of feelings, and, through them, of ideas; but though music of some kind exists wherever the human species is found, it does not follow that every good piece of music must please all men alike, or be understood equally by all; because music is an art requiring cultivation of the mind and heart to appreciate it fully. As civilization advances, music, as a science, gains new admirers.—The Jews were fond of music in their religious ceremonies, their feasts, their public rejoicings, their marriages, and their mournings. The music of the temple was performed by the families of Asaph, Heman, and Jeduthun, the Levites, whose whole business was to learn and practise this agreeable art; and abundant provision was made for them, that they might not be prevented from pursuing their musical studies by the cares of life. Kings and great men among the Jews cultivated music, and David made a very great proficiency in it. Indeed, music reached a high perfection among the Hebrews, and part of their religious service consisted in chanting solemn psalms, with instrumental accompaniments. —The invention of the lyre is ascribed to Hermes Trismegistus, the Mercury of the Egyptians, which is a proof of its antiquity; but a still greater proof of the existence of musical instruments amongst them at a very early period is drawn from the figure of an instrument said to be represented on an obelisk, erected, as is supposed, by Sesostris at Heliopolis. The Greeks, we know, were exceedingly fond of music. It had a considerable share in their education; and so great was its influence over their bodies as well as their minds, that it was thought to be a remedy for many disorders.

MU'SICAL GLAS'SES. [See HARMONICA.]

MUSK (*musc: Fr.*), a dry, light, and friable substance, of a dusky black colour, tinged with purple; it is of a very strong odour, and is agreeable only when in small quantity, or moderated by mixture with some other perfume. It is imported into England from China; but an inferior kind is brought from Bengal, and a still worse description from Russia. From its being a very high-priced article, it is often adulterated, and most usually with dried blood, a substance it very much resembles in appearance.——The *Moschus moschiferus*, or Thibet musk-deer, from which the perfume is obtained, in size and figure resembling a small roebuck. It has no horns; the hair of the body is long, and stands erect; the tail short; the ears long and narrow; the hoofs black; and the tusks, which are nearly two inches long, project considerably. The male is furnished with a small bag, about the size of a hen's egg, hanging from the abdomen, in which is contained the musk. As this animal is naturally timid, it lives on the cliffs and summits of lofty mountains; and in running, leaping, and climbing, displays astonishing agility.

MUSKETOO'N, a species of ancient musket, shorter, thicker, and wider in the bore, than that in ordinary use. It was common in the time of Louis XIV. and subsequently.

MUSK'-OX, the *Ovibos moschatus;* an animal of the ox tribe, which inhabits the most barren parts of North America, to the north of the 60th parallel. It is much smaller than the common ox. Its horns are very broad at the base, covering the forehead and crown of the head, but each curving downwards between the eye and ear, until about the level of the mouth, when they turn upwards. The colour of the hair is generally brown; on the neck and between the shoulders, it is long, matted, and somewhat curled, causing the animal to appear humped; on the shoulders, sides, and thighs, it is of such a length as to hang down below the middle of the leg. The legs are short and thick, and furnished with narrow hoofs. When lean, the flesh smells strongly of musk.

MUSK'-RAT, called in Canada, the *Musquash*, the *Ondatra zibethicus* of naturalists, a rodent animal allied to the beaver, which yields an oily fluid, having the perfume of musk. The colour of its body is a reddish-brown, the belly and breast of an ash colour. The hair is soft and glossy, and beneath it is a thick coat, which is much used in the manufacture of hats. An immense number of skins are annually imported into this country. They live on the banks of small rivers; and where the banks are high they form large and extensive burrows, which have entrances below the surface of the water, and gradually ascend till they terminate in a chamber above the level of high water.

MUSK'-ROSE, a sort of rose from which a highly odorous oil is extracted at Tunis.

MUS'LIN (*mousseline: Fr.*), a fine sort of cotton cloth, which bears a downy nap on its surface. This nap the French call *mousse*, as resembling moss; whence the name *muslin*. Muslins are made in the greatest perfection in Asia; but the nations of Europe imitate the manufacture with great success. The extreme lightness of the finer kinds produced in the East is admirable. But some derive the word from Moussul, a city in Asiatic Turkey.

MUS'SEL, the popular name of several

species of bivalve molluscs. The sea mussels belong to the genus *Mytilus*. Immense quantities of these mussels are collected on our coasts for food. At times they are deleterious, and persons have occasionally died from eating them. The animal anchors itself by a byssus. The *horse mussels* belong to the genus *Modiola*; some of them burrow, others spin a nest. The *river mussels* belong to the genus *Unio*. They secrete an inferior kind of pearl, and these were formerly collected from the mussels of the Scotch rivers. The *swan mussels*, which resemble the last, but with a slight difference in the shell. A single female has been computed to contain 600,000 young.

MUS'SULMAN (the dual of *moslem*, of which the plural is *muslemina*, literally resigned to God: *Arab.*), or MOS'LEM, a follower of Mahomet. This word signifies, in the Turkish language, a true believer.

MUST (*mustum: Lat.*), the juice of the grape, which by fermentation is converted into wine.

MUS'TARD (*moutarde: Fr.*), the ground seeds of some species of cruciferous plants belonging to the genus *Sinapis* It is a powerful stimulant, which is often taken internally, and is used externally in cataplasms

MUSTE'LA (a weasel: *Lat*), in Zoology, a genus of carnivorous animals, including the common weasel and the ermine

MUS'TER-ROLL (*mustern*, to inspect: *Ger*), in a Military sense, a list of the officers and men in every regiment, which is delivered to the muster-master, inspecting field-officer, or whoever is appointed to examine it.

MUTE (*mutus*, dumb: *Lat.*), in Law, a person that remains speechless when he ought to answer or plead. Such a person is now considered to plead *not guilty*, which is entered by the proper officer; in former times he was compelled to answer by torture.——MUTE, a dumb officer of the seraglio, usually employed as an executioner.——One of those employed to stand before a house in which there is a corpse.——In Grammar, a letter that is written but not pronounced, as the vowel *e* at the end of many English words, in some of which, however, it changes the pronunciation of the preceding vowel, rendering it long; thus, *bite*. The *e* mute was formerly added more generally to the end of words, particularly of nouns. Mutes also are consonants which emit no sound without a vowel; as *b*, *p*, *t*, *d*, *k*, with *c* and *g* hard.——MUTE, in Mineralogy, an epithet for minerals which do not ring when they are struck.

MU'TINY (*mutin*, a mutineer: *Fr.*), an insurrection of soldiers or seamen, or an open resistance to the authority of their commanders. Any attempt to excite opposition to lawful authority, or any act of contempt towards officers, or disobedience of commands, is by the British mutiny act declared to be mutiny, and is punishable by the sentence of a court-martial.

MYOG'RAPHY or MYOL'OGY (*muon*, a muscle; and *grapho*, I write; or *logos*, a discourse: *Gr.*), that part of anatomy which treats of the muscles of the human body

MYR'IAD (*murias*, ten thousand: *Gr.*), the number of ten thousand; or, in poetical language, an innumerable multitude.

MYRIAME'TRE (*murias*, ten thousand, *Gr.*; and *mètre*), a French measure containing ten thousand mètres; equal to 10936·13 yards, or two of the old leagues.

MYRIAP'ODA (*murias*, ten thousand; *poda*, feet: *Gr.*), in Zoology, a class of invertebrate animals, which are wingless and possess one or two pairs of feet to each ring of the body. They have antennæ, and are all terrestrial. They are divided into two sections:—1. *Chilopoda*, the centipedes, &c. 2. *Chilognatha*, the scolopendra, &c.

MYR'IARE, a French superficial measure of ten thousand *ares*, or 1,000,000 square mètres.

MYRICINE' (*murikinos*, belonging to the myrtle: *Gr.*—on account of wax being the product of some of the species), in Chemistry, one of the proximate principles of bee's wax, obtained by boiling in alcohol.

MYRIOLI'TRE (*murias*, ten thousand: *Gr.*; and *litre*), a French measure of capacity, containing ten thousand litres, or 610,280 cubic inches, that is, very nearly 355 cubic feet.

MYRIORA'MA (*murias*, ten thousand; and *orama*, a view: *Gr.*), a moveable picture, capable of forming an almost endless variety of picturesque scenes, by means of several fragments or sections of landscapes on cards, which may be placed together in numberless combinations.

MYRME'LEON (*murmos*, an ant; and *leōn*, a lion: *Gr.*), a genus of neuropterous insects, including the *ant lion*.

MYROB'ALAN (*murobalanos; from muron*, ointment; and *balanos*, any glandular fruit: *Gr.*), a dried fruit brought from the East Indies; the produce of trees belonging to the genus *Terminalia*, nat. ord. *Combretaceæ* The Hindoos use it both in medicine and in calico printing. It has an unpleasant bitter taste; produces, with iron, a durable black dye and ink; and with alum, a very full, though dark, brownish yellow.

MYRRH (*murrha: Gr; from mer*, to be bitter: *Heb.*), a fragrant, bitter, aromatic gum-resin, issuing by incision, and sometimes spontaneously, from the trunk and larger branches of a shrub growing on the Abyssinian coast, called by botanists *Balsamodendron Myrrha*, nat. ord. *Amyridaceæ*. Myrrh is light and brittle; does not melt when heated; burns with difficulty; and yields oil by distillation.

MYRTA'CEÆ, a natural order of trees and shrubs, the greater number of which may be recognised by the leaves being opposite, and marked with transparent dots, and their having a vein running parallel with the margin. The common MYRTLE is a shrub of this order, which contains some fruit-bearing trees, such as the Pomegranate, Rose Apple, and Guava. The trees producing cloves, all-spice, and cajeput oil, belong to the order, as well as the Eucalypti of Australia, the Stringy barks and Gum trees of the colonists, some of which are 200 feet high. Several yield oils which are likely to be useful in medicine. Those singular flowering shrubs, the Bottle brushes, which are natives of Australia, belong to Myrtaceæ.

MYR'TLE (*murtos : Gr.*), in Botany, a fragrant shrub, of the genus *Myrtus*, which, among the ansients, was sacred to Venus. The common myrtle is a native of Asia, but has become naturalized in Europe. It has been celebrated from remote antiquity on account of its fragrance and the beauty of its evergreen foliage. Myrtle wreaths adorned the brows of bloodless victors, and were used as the symbol of authority by magistrates at Athens.——MYRTLE WAX, a concrete oil, or vegetable wax, the product of plants of the genus *Myrica*, more commonly known by the name of *Candleberry myrtle*, nat. ord. *Myricaceæ*.

MYS'TERIES (*mustērion : Gr.*), or MIR'ACLES, in the middle ages, were a favourite kind of dramatic spectacles or entertainments, represented at solemn festivals. They were very common previous to the '*Moralities*' [which see]; and were called *Mysteries* and *Miracles*, because they taught the mysterious doctrines of Christianity, and represented the miracles attributed to the saints and martyrs. At first the ecclesiastics were both the authors and the performers of them.

MYS'TERY (same *deriv.*), something secret or concealed, impossible or difficult to comprehend. The Eleusinia, or sacred rites of Ceres, solemnized at Eleusis, were called, by way of eminence, *the Mysteries ;* and with such superstition were they concealed, that if any person divulged any part of them, he was thought to have called down some divine judgment on his head, and it was accounted unsafe to abide under the same roof with him; Horace, indeed, declares that he would not put to sea in the same ship with one who revealed the mysteries of Ceres. The whole religion of the Egyptians was mysterious, and both their doctrines and worship wrapped up in symbols and hieroglyphics.——The religion of the *Jews* was likewise full of mysteries; their laws, nay, their whole constitution and nation, were mysterious.

MYS'TICS (*mustikos*, secret: *Gr.*), those whose tendencies in religion are towards a more direct communication with God than is afforded by revelation; not through the medium of the senses, but through the inward perception of the mind. Thus the *quietism* of Madame Guyon, Fenelon, &c., sought for revelation in a species of ecstasy. The Illuminati in Germany, the followers of Swedenborg, &c., were mystics.

MYTH (*muthos*, a story: *Gr.*), originally signified a current narrative, and nothing more. Afterwards it came to mean an ancient tradition, without authentic basis, and sometimes known to be untrue. [See the next article.]

MYTHOL'OGY (*muthologia*, literally a telling of fables: *Gr.*), the collective body of the traditions of any people regarding its gods and other supposed preternatural beings. Whether mythological fables are to be considered as allegorical expositions of truth, or as founded on historical facts, which have been varied and exaggerated by tradition, embellished by poetry, and purposely altered by cunning, they still retain their interest for the student of human nature, to whom it is almost as important to study the wide aberrations of mankind in their search for truth as their successful attempts to attain it. Grote, who considers the Grecian myths to be a special product of the imagination and the feelings, radically distinct both from history and philosophy, thinks that they 'were originally produced in an age which had no records, no philosophy, no criticism, no canon of belief, and scarcely any tincture of astronomy or geography; but which, on the other hand, was full of religious faith, distinguished for quick and susceptible imagination, seeing personal agents where we look only for objects and connecting laws; an age, moreover, eager for new narrative, accepting with the unconscious impressibility of children all which ran in harmony with its preexisting feelings, and penetrable by inspired prophets and poets in the same proportion that it was indifferent to positive evidence To such hearers did the primitive poet or story-teller address himself. It was the glory of his productive genius to provide suitable narrative expression for the faith and emotions which he shared in common with them, and the rich stock of Grecian myths attests how admirably he performed his task. As the gods and the heroes formed the conspicuous object of national reverence, so the myths were partly divine, partly heroic, partly both in one.' At a later time, when the Grecian mind was more developed, the same writer says, that 'while the literal myth still continued to float among the poets and the people, critical men interpreted, altered, decomposed, and added, until they found something which satisfied their minds as a supposed real basis. They manufactured some dogmas of supposed original philosophy, and a long series of fancied history and chronology, retaining the mythical names and generations, even when they were obliged to discard or recast the mythical events. The interpreted myth was thus promoted into a reality, while the literal myth was degraded into a fiction.

N

N, the fourteenth letter and eleventh consonant of the English alphabet, is an imperfect mute, or semi-vowel, because part of its articulation may be continued for any length of time; it is also a liquid, and a nasal letter, the sound being formed by forcing the voice strongly through the mouth and nostrils, and, at the same time, intercepting it, by applying the tip of the tongue to the fore part of the palate, with the lips open. It has one sound only, and after *m* is silent, or nearly so, as in *hymn*, *condemn*. Among the ancients, N, as a numeral, stood for 900; and with a dash over it, for 9000. N. or No. is an abbreviation for *numero*, number; also for *north;* for *Nota*, as N. B. *nota bene* (mark well); for *New*, as N. S. *New Style;* for *Non*, as N. L. *Non liquet* (the cause is not a clear one); for *Notarius*, as N. P. *Notarius Publicus* (notary public); *Nem. con.*, *nemine contradicente* (no one contradicting); *Nem. dis.*, *nemine dissentiente* (no one dissenting), &c.

NA'BOB (*nawâb;* from *naib*, a deputy: *Ind.*), the governor of a province, or commander of an army, under the Moguls. During the decay of the empire of the Moguls, some of the nabobs became independent; and remained so, until their dominions were conquered by the English. In popular language, the word is applied to those Europeans who have amassed a large fortune in India, and live in splendour.

NAC'ARAT (*nacar*, mother-of-pearl: *Span.*), a crape or fine linen fabric, dyed fugitively of a pale red colour, which ladies sometimes rub upon their faces, to give them a delicate tinge of pink.——A marine shell-bearing mollusc, belonging to the genus *Pinna*, which has a byssus that affords silky fibres, woven by the Italians into various articles.

NA'CRITE (*nacré*, pearl: *Fr.*), in Mineralogy, a substance of a pearly lustre; a silicate of alumina and potash, found crystallized in granite.

NA'DAB (a prince: *Heb.*), the sovereign pontiff or high-priest of the Persians, whose dignity and office are very similar to those of the mufti among the Turks.

NA'DIR (*nazeer*, opposite: *Arab.*), in Astronomy, that point of the heavens which is diametrically opposite to the zenith, and directly under the place where we stand. The *zenith* and *nadir* are the two poles of the horizon.

NA'HUM, or PROPHECY OF NAHUM, a canonical book of the Old Testament. Nahum, the seventh of the twelve minor prophets, was a native of Elkoshai, a small village of Galilee. The subject of his prophecy is the destruction of Nineveh, which he describes in the most lively and pathetic manner, his style being bold and figurative.

NA'IADS (*Naiades;* from *nao*, I flow: *Gr.*), in Mythology, water-nymphs, or deities that preside over brooks and fountains. They are represented as beautiful women, having their heads crowned with rushes, and reclining against an urn, from which water is flowing.

NAI'ANT (*nageant*, swimming: *Fr.*), in Heraldry, an epithet for fish that are borne across the escutcheon as if swimming.

NAIL (*nägel: Ger.*), a horny excrescence growing at the ends of the fingers and toes of men and animals. When nails are compressed, curved, pointed, and extended beyond the digit, they are called *talons* or *claws*. When they encase the extremity of the digit like a box, they are called *hoofs*. The substance of the nail is that of the skin, hardened, but firmly connected with it; for this reason, it is extremely sensible at its root, where it is yet tender; but at the apex, where it is perfectly hardened, it is capable of being cut without pain.——NAILS, in Building, &c., small spikes of iron or other metal, generally with a head, formed for driving into, and fastening together, boards, &c. Of these there are numerous kinds; and of such importance is the manufacture become, that several patents have lately been taken out for improved nail-making machinery, as well as for nails made by hand labour.——NAIL, a measure of length containing the sixteenth part of a yard.

NAIS'SANT (being born: *Fr.*), in Heraldry, a term applied to any animal issuing out of the midst of some ordinary, and showing only its head, shoulders, fore feet and legs, with the tip of its tail.

NAÏ'VETÉ (*Fr.*), absence of artifice. The essential meaning of the word is, a natural, unreserved expression of sentiments and thoughts, without regard to conventional rules, and without weighing the construction which may be put upon the language or conduct. When it is genuine, it implies a guileless simplicity of heart, unimpaired by the chilling experience of society; but when affected, it is pre-eminent hypocrisy, and a good judge of human nature will infallibly detect it.

NAME (*nomen: Lat.*), a word by which men have agreed to express some idea, or which serves to signify a thing or subject spoken of. Names are either proper or appellative. *Proper* names are those which represent some person or place, so as to distinguish it from all others of the same species. Names of persons are either *Christian names*, being given us at baptism, or *surnames;* the first is intended for the distinction of individuals, the second for the distinction of families. The Romans usually had three names: the *prænomen*, answering to our Christian name; the *nomen*, that of the tribe; and *cognomen*, that of the family; to these was sometimes added the *agnomen*, derived from some peculiarity in the character of the individual. All are exemplified in the names Publius Cornelius Scipio Africanus. We do not use either a *clan-name* or an *agnomen*.

NANKEEN′ or **NANKIN′**, a sort of cotton cloth, of a firm texture, which takes its name from *Nankin*, in China, where it was originally manufactured. It is now imitated in most other countries where cotton goods are woven; but none is equal to that made in the East, on account of the natural colour of the cotton (the *Gossypium religiosum*) being reddish, while we are compelled to dye what we manufacture.

NAPH′THA (*Gr.*), or ROCK-OIL, in Mineralogy, one of the thinnest of the liquid bitumens, the thicker kinds being called *Petroleum*. It issues from the earth, is of a light brown or yellowish colour, and is found on the borders of springs round the shores of the Caspian Sea. It feels greasy, has a bituminous smell, easily takes fire, and is so light as to float on water. The city of Genoa is lighted by means of a naphtha spring at Amiano, in the state of Parma. The term naphtha is also given to one of the products of the distillation of coal. It inflames at a low temperature, and is too dangerous to be used in lamps.

NAPH′THALINE (last), a white and highly volatile substance, which may be extracted by distillation from coal tar. Its vapour condenses into white flaky crystals. It is a compound of carbon and hydrogen, and, with sulphuric acid, forms *sulpho-naphthalic* acid

NA′PLES YEL′LOW, a fine pigment, employed not only in oil-painting, but also for porcelain and enamel It has a fresh, brilliant, rich hue. Of late years chromate of lead has very much superseded its use.

NARCIS′SUS (*narkissos*, from *narkē*, torpor: *Gr.*—on account of the effects produced by its smell), in Botany, a genus of plants, nat. ord. *Amaryllidaceæ*, including daffodils, jonquils, tazettas, &c.

NARCOT′ICS (*narkōtikos*; from *narkē*, torpor: *Gr.*), soporiferous medicines, which, by causing stupefaction, take away the sense of pain. They seem to act first as stimulants; in large doses they produce tranquillity of mind, torpidity, and even coma. They are distinguished from mere *sedatives*, which produce no preliminary excitement. *Opium* is a narcotic; *henbane*, a sedative.

NAR′COTINE (same *deriv.*), in Chemistry, the pure narcotic principle of opium.

NARD (*nardos*: *Gr.*; from *nerd*: *Heb.*), a species of aromatic oil, with which the ancients anointed themselves at their feasts.

NAR′WAL, or **NAR′WHAL** (*Narwall*: *Ger.*), in Zoology, the *Monodon monoceros*, a cetaceous animal. [See MONODON.]

NA′SAL (*nasus*, the nose: *Lat.*), an epithet sometimes applied to the letters *m* and *n*, because their sound partly depends upon the nose.—NASAL BONES, two small bones in the face, forming the osseous portion of the nose.

NASTUR′TIUM (*Lat.*: as if *nasi-tortium*, a torment of the nose, from its pungent smell), in Botany, a genus of cruciferous plants, including the common water-cress. The name is commonly given to the Indian cresses, plants of the nat. ord. *Tropæolaceæ*.

NATA′LIS, or **NATA′LIS DI′ES** (literally a birthday: *Lat.*), the day on which the birth of any one is commemorated; but the term was used by the ancients more particularly to signify the anniversary of the birthday of a deity, an emperor, or a distinguished person. On such occasions, every Roman was dressed in white, wore a ring called the *annulus natalis*, offered sacrifices to the genius of the person whose birthday was celebrated, and terminated the whole with a feast.

NA′TIONAL DEBT, a sum borrowed by government, on the security of the existing taxes, which are pledged to the lender for the payment of the interest on the sum borrowed. Thus, at the Revolution, for the purpose of avoiding unpopular taxation, the English government borrowed of a company then incorporated under the name of the Bank of England; and, as the system was found convenient, this debt increased. The progressive augmentation of the national debt was as follows:—At the Revolution, in 1688, it was 664,263*l.*; at the accession of queen Anne, in 1702, 16,394,702*l.*; at the accession of George I., in 1714, 54,145,363*l.*; at the accession of George II., in 1727, 52,092,238*l.*; at the commencement of the American war, in 1775, 128,583,635*l.*, at the conclusion of the American war, in 1784, 249,851,628*l.*; at the commencement of the French revolutionary war, in 1793, 239,350,148*l.*; at the conclusion of the French revolutionary war, 840,850,491*l.*; on the 1st of February, 1817, when the English and Irish exchequers were consolidated, 840,850,491*l.* The debt cancelled from the 1st of February, 1817, to the 5th of January, 1850, was 49,041,153*l.*, leaving the remaining debt at 791,809,338*l.* 279,551 persons were receiving half-yearly dividends, from 5*l.* upwards; but the number of persons really having an interest in the national debt is very much greater, since, in the above enumeration, companies acting as factors or trustees for a great number are counted only as individuals. In 1856, the national debt, on account of the Russian war, had become 808,108,722*l.*; but since that time it has been reduced by a few millions.

NATIV′ITY (*nativitas*: *Lat.*), the day of a person's birth. The word is chiefly used in speaking of the saints, as the nativity of St. John the Baptist, &c. But when we say *the Nativity*, it is understood to mean that of Jesus Christ, or *Christmas-day*. Among the astrologers, it meant a *horoscope*, which see.

NA′TROLITE (*natron*; and *lithos*, a stone: *Gr.*), in Mineralogy, a hydrated silicate of soda and alumina, which occurs in small rounded fibrous masses, of a yellowish colour. It is called by some *prismatic zeolite*.

NA′TRON, native carbonate of soda, or mineral alkali. This substance was used by the Egyptians in large quantities when embalming. It is common in Egypt; and in Mexico and Columbia there are several natron lakes, from the bottom of which native mineral natron is dug up.——NATRON, the German name for soda, on which account sodium is termed *natrium*.

NAT'URAL (*naturalis : Lat.*), in Music, a character which contradicts a flat or sharp placed at the beginning of a stave or elsewhere, and causes the note to become what it would be if the flat or sharp were not used.——**NATURAL**, in Heraldry, a term used when animals, fruits, flowers, &c., are blazoned with their natural colours.

NAT'URALIST (*naturalis*, natural : *Lat.*), a person well versed in the study of nature and the knowledge of natural bodies, especially in what relates to animals, vegetables, and minerals.

NATURALIZA'TION (*naturalis*, by birth : *Lat.*), in Law, the act of placing an alien in the condition of a natural subject. On memorializing the home secretary, and taking a prescribed oath, aliens may acquire nearly all the rights of natural-born subjects, except that they cannot become members of the privy council, or of either house of parliament. [See ALIEN.] Naturalization of an alien by *act of parliament* has a retrospective effect. His son, for instance, born before his naturalization, may inherit, &c. This is not the case with naturalization by certificate of a secretary of state.

NAT'URAL HIS'TORY, in its most extensive sense, is the description of material existences composing the universe. But it is usually limited to the study of the animal, vegetable, and mineral objects of our globe. In this sense it includes zoology, botany, geology, and mineralogy, with their dependent sciences.

NAT'URAL OR'DERS OF ANI'MALS AND PLANTS, as opposed to artificial systems, are those in which beings are brought more nearly together, in proportion as they are related in structure and affinity. As more animals and plants become known, and as naturalists become better acquainted with their structure, existing arrangements will have to undergo repeated modifications. All the organs must be taken into consideration, and the affinity of any two or more beings will be determined by the agreement or disagreement, first in the more important organs, and then in the less important. The relative importance of organs is a matter that requires preliminary investigation.

NAT'URAL PHILOS'OPHY, or PHYSICS, a collection of sciences, treating of the laws of nature, the properties of bodies, so far as they are or may be considered to be destitute of life, and the action of these bodies upon each other. Under this head are comprehended astronomy, chemistry, electricity, galvanism, magnetism, mechanics, hydrostatics, pneumatics, optics, &c.

NA'TURE-PRINT'ING, an art whereby truthful impressions of leaves, mosses, feathers, embroidery, and other objects, may be obtained. It consists of pressing the object to be copied into a plate of soft metal, by which means an accurate mould is obtained, from which casts can be taken. Impressions can then be taken from these casts.

NAUMACH'IA (*Gr.*: from *naus*, a ship; and *machē*, a fight), the representation of a sea-fight, which among the Romans formed a part of the Circensian games. These mock sea-fights are supposed to owe their origin to the time of the first Punic war, when the Romans were first initiated in the knowledge of naval affairs. Afterwards they were intended both to entertain the populace and improve the seamen. They were frequently, like other shows, produced at the expense of individuals, to increase their popularity. Nero exhibited one, on an artificial lake, in which large marine animals were seen swimming about. At one given by Claudius, there were 19,000 combatants. The seats for the spectators, at these exhibitions, were arranged somewhat similarly to those in the amphitheatre—in which, indeed, as well as in other places of the same description, naumachiæ were sometimes exhibited, on a smaller but still very magnificent scale. The *naumachiarii*, or persons who fought on these occasions, were gladiators, slaves, criminals, &c., who were doomed to die, unless they were saved by the interposition of the people, or of the person presiding at the spectacle.

NAU'SEA (*nausia*, sea-sickness ; from *naus*, a ship : *Gr.*), in Medicine, a sickness of the stomach, accompanied by a sensation similar to that of sea-sickness, whence its name.

NAU'TILUS (*nautilos*, a sailor: *Gr.*), shell-bearing molluscs, allied to the cuttle fishes, in the class of Cephalopoda. The true nautilus (*N. pompilius*) has a shell formed of one continuous piece, rolled into a spiral form, and having its cavity divided into a great number of chambers by transverse partitions, each of which has a perforation, the various perforations being connected with each other by means of a pipe carried the whole length of the shell. The fossil species of nautilus, which are very numerous, are found in all geological formations. The *Paper Nautilus* (*Argonauta argo*) is a different animal, but belonging to the same class. Its shell is thin and translucent, but not chambered. The long arms are furnished with numerous suckers, by which it lays hold of its prey. The story of its floating on the sea in fine weather, driven along by the breeze acting on its sail-shaped arms, is a fable repeated from the time of Aristotle to this day.

NA'VAL AR'CHITECTURE (*navalis*, belonging to a ship : *Lat.*), or SHIP-BUILDING. The art of constructing vessels for the purposes of navigation was practised, after a rude manner, in Egypt. The Greeks are supposed to have derived their knowledge of it from the Carthaginians. But neither in Greece nor in Rome did naval architecture rise to what may be considered as the result of scientific knowledge. The crusades first gave the impulse to improvements in ship-building, which, notwithstanding, continued for some time at a low ebb. The states of Venice and Genoa were the first to increase the size of their vessels, but they were soon surpassed by the Spaniards, who first employed cannon. The Hanse towns made such progress that in the 14th century it was usual for them to let their ships out to foreign princes. In the reign of Henry IV., ships of considerable size began to be built in England, and they continued to increase in magnitude until the reign of Henry VIII., when the *Regent*, of 1000 tons burden, and the *Henry Grace Dieu*, which was larger, were built. From the reign of Charles II., the navy of Great Britain acquired great importance, and in consequence of the wars which have since been carried on in several reigns, it has risen to its present state.——**NAVAL STORES** comprehend all those articles made use of, not only in the royal navy, but for naval purposes generally; as timber and iron for shipping, pitch, tar, hemp, cordage, sail-cloth, gunpowder, ordnance and firearms of every sort, ship-chandlery, &c.

NA'VAL CROWN (*navalis corona*), a crown, among the Romans, given to him who first boarded an enemy's ship; it was a circle of gold representing the prow of a ship.

NAVE (*navis*, a ship: *Lat.*), in Architecture, the middle or body of a church, extending from the baluster or rail of the choir to the chief door.——**NAVE** (*nabe: Ger.*), that part in the middle of a wheel where the spokes are fixed.

NAVIGA'TION (*navigatio: Lat.*), the art and science by which, in open seas, ships are conducted from port to port. This is effected by the use of charts, and by keeping a journal of the courses from hour to hour, and the distance on each, by means of the log-line; also by observations on the sun, moon, and stars. Imperfect as were the means and knowledge of the ancients in this noble art, yet the Carthaginians, who superadded the greatest commercial enterprise to the greatest skill which had yet been attained, achieved the most brilliant results. They made the whole of the old world tributary to their city. Not contented with exploring every nook and corner of the Mediterranean, they left behind the limits which had bounded the excursions of their predecessors, visited the Atlantic coasts of Europe, the British isles, and, pursuing the grand idea which afterwards led the Portuguese to India, discovered a vast extent of the western coast of Africa. The art of navigation gained nothing for a long period after the fall of Carthage, and the invasion of the northern barbarians effectually extinguished the few gleams of science which had survived her destruction. Everything remained stationary for centuries, until the discovery of the magnet, and the invention of the mariner's compass which followed it. [See MAGNET, COMPASS, &c.]

NAVIGA'TION LAWS, a most important branch of maritime law, defining the peculiar privileges to be enjoyed by British ships, and the way in which they shall be manned; as also the conditions under which foreign ships shall be allowed to engage in the trade of this country, either as importers or exporters of commodities. As long ago as the reign of Henry VII., the importation of certain commodities was prohibited, except in ships belonging to English owners, and manned by English seamen. But a regard for our manufacturing and commercial interests led to the adoption of, first, what was called the 'reciprocity system' in our intercourse with other nations; to the total repeal of the navigation laws in 1850—except that trade from one part of any British possession, in Asia, Africa, and America, to another part of the same possession, must still be carried on in British ships, unless the legislature of such possession ask to be freed from this restriction; and, finally, to the adoption, in a very great degree, of the principles of free trade.

NA'VY (*navis*, a ship: *Lat.*), the whole naval establishment of any country, including the collective body of ships, officers, men, stores, &c. That part of the navy of Great Britain which is distinguished by the title of the *royal navy*, comprehends all ships of war and their crews, &c. The ministerial management of the royal navy of Great Britain is entrusted to seven lords commissioners for executing the office of the lord high-admiral of England, commonly known by the title of lords of the admiralty. Commissioners of the navy are officers whose department is wholly distinct from that of the admiralty. The number of those resident in London is eight, and there are others stationed in different parts of the empire. They superintend the dockyards, and provide the vessels which the admiralty requires for service. To the royal navy there also belong a victualling office, an office of sick and wounded seamen, and a pay office. Ships are classified according to the guns they carry. All those having 110 guns and upwards, or whose complements consist of 950 men or more, are *first-rate*. One of her majesty's yachts, and all ships having less than 110 guns, and not less than 80, and whose war complements consist of 750 men and upwards, are *second-rate*. The other royal yachts, and all yachts bearing the flag or pendant of an admiral, or captain superintendent of a dockyard; all ships whose complements are under 750, and not less than 620, and whose guns are from 70 to 80, are *third-rate*. Ships whose complements are under 620, and not less than 450, and whose guns are from 50 to 70, are *fourth-rate*. Ships whose complements are under 450, and not less than 300, and whose guns are from 36 to 50, are *fifth-rate*. All other ships having a captain, and whose guns are from 24 to 36, are *sixth-rate*. Steam vessels are assigned a rate by the lords of the admiralty. Troop-ships, surveying-ships, fire-ships, store-ships, or those used on a temporary service, do not receive a rate higher than the fourth.

NAZ'ARITE (*nazar*, to separate: *Heb.*), in the Jewish dispensation, one separated to the Lord by a vow. Nazarites were sometimes bound for their whole lives, at others only for a time. They were obliged to refrain from wine, to allow their hair to grow, to avoid coming into contact with a corpse, &c. The word *Nazarene* meant a very different thing; it was applied to the natives of Nazareth, and was used, in contempt, to indicate the first Christians. A sect of *Nazarenes* sprang up in the second century they endeavoured to ingraft the Jewish on Christian rites.

NEAP′-TIDES (*nepflod*, low: *Sax.*—a word used *only* in speaking of the tide), the tides in the second and last quarters of the moon. Also low tides, not so high or so swift as the spring-tides. They occur when the attractions of the sun and moon act at right angles, the difference of their effects only being left.

NEAT (an ox: *Sax.*), all kinds of *bovine* cattle; as the ox, cow, &c. *Neat's-foot oil* is an oil extracted from the feet of oxen; and *Neat's leather* is leather made of the hide of an ox.

NEB′ULÆ (*nebula*, a vapour: *Lat.*), in Astronomy, certain luminous spots in the heavens, many of which the telescope resolves into groups of stars, whilst others resist the power of the best instruments, although astronomers are led to think that irresolvable nebulæ are also groups of stars. Some nebulæ have very fantastic or complicated shapes, and most of them undergo great change in appearance, according to the power of the telescope with which they are viewed. Nebulæ have been thus classed: 1. Those that are resolvable into clusters of stars; some are globular, others elliptic, others of an irregular figure. 2. Such as lead the observer to suspect that they consist of stars, and would be resolved by telescopes of higher power. 3. True nebulæ, in which there is not the slightest appearance of stars, with the highest powers that can be directed to them 4. *Planetary nebulæ*, which have exactly the appearance of planets, and are of immense magnitude; their light must be most brilliant. 5. *Stellar nebulæ*, whose nebulous matter is greatly and suddenly condensed towards the centre; and 6. *Nebulous stars*, which are brilliant stars, surrounded by a perfectly circular disk or atmosphere of faint light. Upwards of 5000 nebulæ have been catalogued. [See MAGELLANIC CLOUDS.]

NECES′SITY (*necessitas: Lat.*), the cause of that which cannot be otherwise; or whatever is done by a power that is irresistible, in which sense it stands opposed to *freedom*. The schoolmen distinguish a physical necessity and a moral necessity; a simple or absolute necessity, and a relative one. *Physical necessity* is that which arises from the laws of nature, and which cannot be overcome without, for the occasion, setting those laws aside. *Moral necessity* is only a great tendency, such as that arising from a long habit, a strong inclination, or a violent passion. *Simple* or *absolute necessity* is that which has no dependence on any state or conjuncture, or any particular situation of things, but is found everywhere, and in all the circumstances in which the agent can be placed. *Relative necessity* is that which renders a person incapable of acting, or not acting, in those circumstances and that situation in which he is found; though in other circumstances, and in another state of things, he might, at pleasure, act or not act. When a man's actions are determined by causes beyond his control, he acts from *necessity*, and is not a free agent.

NECK (*nacken: Ger.*), in Anatomy, that slender part situated between the head and the trunk of the body. Its osseous part consists in the mammalia of seven cervical vertebræ. In birds there are from ten to twenty-three vertebræ in the neck.——In Architecture, the *neck of a capital* is the space above the shaft of a column, between the annulet of the capital above, and the astragal at the top of the shaft below.——NECK OF LAND, a long narrow tract projecting from the mainland; or a narrow tract connecting two larger tracts.

NEC′ROLITE (*nekros*, dead; and *lithos*, a stone: *Gr.*), in Mineralogy, fœtid felspar; a mineral which, when struck or pounded, exhales a fœtid odour like that of putrid flesh. It is found, in small nodules, in the limestone of Baltimore.

NECROL′OGY (*nekros*, a dead body; and *logos*, a catalogue: *Gr.*), a register of the deaths of benefactors in a monastery. Formerly, also, what is now called a *martyrology* was called a *necrology*.——A register of distinguished persons who die within a certain period (not a record of their lives and actions, for that is *biography*) is also known by this term.

NEC′ROMANCY (*nekromanteia*: from *nekros*, dead; and *manteia*, prophecy: *Gr.*), a sort of magic practised among the Jews, Greeks, and Romans, by which they attempted to raise the dead, or make them appear. The witch of Endor was a striking example of a bold and artful deception of this kind.

NECROP′OLIS (*nekros*, dead; and *polis*, a city: *Gr.*), the name given to some ancient cemeteries in the vicinity of large cities; and also to some of our modern ones.

NEC′TAR (*Gr.*), in Mythology, the supposed drink of the gods, which was imagined to contribute much towards their eternal existence. It was, according to the fables of the poets, a most delicious liquor, far exceeding anything that the human mind can imagine. It gave a bloom, a beauty, and a vigour, which surpassed all conception, and, together with *ambrosia* (their solid food), repaired all the decays or accidental injuries of the divine constitution.——Also a sweet wine of Scio.

NEC′TARINE (*nectareus*, sweet as nectar: *Lat.*), a fruit differing from the common peach, of which it is a variety, in having a smoother rind and a firmer pulp.

NECTA′RIUM, or NEC′TARY (*nectar*, honey: *Lat.*), in Botany, that part of the corolla which contains honey-like matter. It is very various in its figure; being sometimes only a hollow in a petal, sometimes a little squama or tubercle, and sometimes a plain tube. The term has been also vaguely applied to any part of a flower which has an unusual shape; for example, to the crown of Narcissus and the rings of filaments in the Passion flower.

NEE′DLE (*nedl: Anglo-Sax.*), a steel implement used in sewing, embroidery, &c. Needles are made from wire that is drawn into various sizes and cut into pieces that are flattened at one of their ends, in which the eyes are then formed with a punch; they are next filed at the points, hardened, and finally polished with emery powder. ——**Magnetic Needle**, in Navigation, a slender bar of steel magnetized, and moving freely on a pivot. It arranges itself in the direction of the magnetic force of the earth: one end or pole pointing to the north, and the other to the south. As only opposite magnetic poles attract each other, it is, in reality, the south pole of the needle which points to the north pole of the earth; though it is always called its *north* pole. [See Compass, Magnetism.]

NE EX'EAT REG'NO (let him not go out of the kingdom: *Lat.*), in Law, a writ directed to the sheriff, or to the party himself, to prevent him from leaving the kingdom. The writ lies where there is a suit in equity regarding a demand for which the plaintiff could not arrest at law.

NEFAS'TI DI'ES (inauspicious days: *Lat.*), an appellation given by the Romans to those days on which it was not allowed to administer justice or hold courts.

NEGA'TION (*negatio: Lat.*), in Logic, a denial.

NEG'ATIVE (*negativus*, that denies: *Lat.*), in general, something that implies a negation: thus we say, negative quantities, negative signs, negative powers, &c.——In Logic, an epithet applied to propositions in which the copula is negative.——**Negative Quantities**, in Mathematics, those which are *opposed* to positive. It is an error to state, as is sometimes done, that they are less than nothing; there is no such quantity as one less than nothing, and negative quantities are as real as positive. Thus, if money which I possess is considered to be a *plus* or *positive* quantity, money which I owe must be a *minus* or *negative* quantity. If seven miles towards the east are to be considered as *positive*, seven miles in the opposite direction, or towards the west, are *negative*. It is evident that any quantity of one kind will neutralize an equal quantity of the other; but that, if the quantities are unequal, what is left will be of that kind which was in excess. Thus, if I owe 5*l.*, and have 3*l.*, taking the 3*l.* which I have from the 5*l.* which I owe, 2*l.* of a debt will be left: that is, substracting minus 5 from plus 3, minus 2 will remain. The characters plus and minus (+ and −) have two different objects to fulfil: one being to show whether a quantity is positive or negative, the other to indicate whether it is to be added or subtracted. When no sign is expressed, the positive is always understood.——**Negative Electricity**, that state of bodies in which they are deprived of some portion of the electricity which they naturally contain; or, according to others, that in which they have free resinous electricity. [See Electricity.]——**Negative Pregnant**, in Law, is a negation which implies an affirmation. Thus, when a person denies having done a thing in a certain manner or at a certain time, as stated in the declaration, he implies that he did it in some manner.

NE'GRO (*niger*, black: *Lat.*), a variety of the human species deriving their name from one of their most striking characteristics, their black colour. Their native region seems to be the central portion of Africa; but the negro formation prevails also in Eastern and Western Africa, and, extending southwards, is most strongly marked in Guinea. The origin of the negroes, and the cause of this remarkable difference from the rest of the human species, have been the source of much argument among naturalists. In Africa itself many nations of Ethiopia are not black, nor were there any blacks originally in the West Indies. In many parts of Asia, under the same parallel with the African region inhabited by blacks, the people are merely tawny. It is affirmed that the degree of development of the *rete mucosum* and its pigment determines the power of resisting the excessive heat of the sun in tropical climates, as evinced by the negro (the type, in this respect, of the dark races), the European, and the Albino. It has long been the prevailing opinion among naturalists that the negro race is inferior, both in organization and in intellectual powers, to the European; and, whatever the cause whence it has arisen, negroes have never as yet distinguished themselves either as nations or individuals. Those African and other states in which the negro predominated, have been either devoid of civilization, or indebted to a foreign element for any civilization they possessed. And in a space of 4000 years, the race, whatever opportunities it may have had, has not produced one who has been eminently distinguished for his achievements, or his proficiency in any branch of human knowledge. Undoubtedly negroes have hitherto laboured under great disadvantages; for, from the earliest times, they seem to have been doomed to supply the more fortunate races with slaves; but the experience of the past indicates that, only by admixture with other races, and in proportion as they deviate from the true negro type, do they make any progress in civilization and enlightenment. Those, however, who hold the most extreme views on this point admit that education can do much in enlightening and improving them. [See Slave Trade.]

NEHEMI'AH, a canonical book of the Old Testament, so called from the name of its author. Nehemiah was born at Babylon during the captivity, and succeeded Ezra in the government of Judah and Jerusalem. He was a Jew, and was promoted to the office of cup-bearer to Artaxerxes Longimanus, king of Persia; and the opportunities he had of being daily in the king's presence, together with the favour of Esther the queen, procured him the privilege of being authorized to repair and fortify the city of Jerusalem, in the same manner as before its destruction by the Babylonians.

NEM. CON. and NEM. DIS. The former is a contraction for *nemine contradicente* (no one contradicting); and the latter, for *nemine dissentiente* (no one dissenting).

NEM'ÆAN GAMES, in Antiquity, celebrated games in Greece, deriving their name from Nemæa, a village between the cities of Cleonæ and Philus, in Argolis, where they were celebrated every third year. They were instituted in memory of Archemorus or

Opheltes; but, having been for some time interrupted, they were revived by Hercules, in honour of Jupiter, after his victory over the Nemæan lion. These games were of the same kind as the Olympian, and the victors were crowned with parsley.

NEOCO'MIAN, in Geology, a term applied to the lower portion of the Cretaceous series. It is divided into the lower **GREENSAND** group, which is well developed at Neufchatel (anciently Neocomum, in Switzerland, whence the name), and the **WEALDEN** beds of Kent and Sussex.

NEOL'OGY (*neos*, new; and *logos*, a word: *Gr.*), the introduction of new words into a language. The progress of science has of late years necessarily given rise to many *neologisms*; but the practice of coining new words to express old ideas cannot be too severely reprehended.——**NEOLOGY** is also the name given to the rationalist system of interpretation, which is applied by many German and English divines to the records of revealed religion.

NE'OPHYTE (*neophutos*: from *neos*, new; and *phutos*, grown: *Gr.*), a new convert or proselyte; a name given by the early Christians to such as had recently been converted from paganism.

NEOZO'IC (*neos*, new; *zoe*, life: *Gr.*), a term applied by some geologists to all the strata included in the secondary and tertiary epochs, in contra-distinction to the older or palæozoic strata.

NEPEN'THE (*nēpenthes*: from *nē*, not; and *penthos*, sorrow: *Gr.*), in Antiquity, a kind of magic potion, supposed to make persons forget their sorrows and misfortunes. It was the juice or infusion of a plant now unknown. We use the term figuratively, to express what gives rest and consolation to an afflicted mind.

NEPH'ELINE (*nephelē*, a cloud: *Gr.*), a mineral found mixed with other substances, primitive or volcanic, in small masses or veins. It is white or yellow. When thrown into nitric acid, its transparent fragments become *cloudy*. It is a double silicate of alumina and soda, and is known also by the name of *sommite*.

NE'PHRITE (*nephritēs*, like the kidney: *Gr.*), in Mineralogy, a sub-species of *jade*, occurring in granite and gneiss, remarkable for its hardness and tenacity. It is of a leek-green colour, and was formerly worn as a remedy for diseases of the kidneys. The Chinese are celebrated for the manufacture of articles from this substance. It consists of silica, alumina, and magnesia.

NEPHRI'TIS (*nephros*, the kidneys: *Gr.*), in Medicine, an inflammation of the kidneys. Hence *nephritics*, medicines proper for diseases of the kidneys, particularly for urinary calculi.

NEPHROT'OMY (*nephros*, the kidney; and *temno*, I cut: *Gr.*), the operation of extracting a stone from the kidney.

NE PLUS UL'TRA (*Lat.*), *no farther*, the extremity, or utmost extent to which anything can go.

NEP'TUNE (in Mythology, the god of the sea), the most remote planet at present known. For several years irregularities had been noticed in the motions of Uranus, which it was conjectured were caused by the disturbing force of some exterior planet. In 1846, M. Leverrier of Paris and Mr. Adams of Cambridge occupied themselves independently, and unknown to each other, in calculating the place of the theoretical planet, and the former having communicated the result at which he had arrived to Dr. Galle of Berlin, that astronomer, on the 23rd of September, 1846, discovered the planet since called Neptune, as a star of the eighth magnitude. This discovery is justly regarded as one of the greatest triumphs of modern astronomy. *Neptune* is 2800 millions of miles from the sun; its diameter is 39,790 miles; its mean sidereal period is 164¾ years, but the time of its revolution on its axis is not yet known; the inclination of its orbit (which is nearly circular) to the ecliptic, is 1° 46′ 59″. Some astronomers have suspected that it has a ring, and it certainly has at least one satellite; but, even with the most powerful telescopes, it is difficult to make any observation with regard to its satellites, physical constitution, &c.

NEPTU'NIAN, or **NEP'TUNIST**, one who adopts the theory that the substances of which the earth is composed were formed from an aqueous solution; opposed to the *Plutonic* theory, which attributes the earth's formation to the action of fire.

NE'REIDS (*Nērēides*: *Gr.*), in Mythology, *sea-nymphs*, daughters of Nereus and Doris, celebrated for their beauty, and represented as riding upon sea-horses, sometimes with the human form entire, and at others with the tail of a fish.

NE'RIUM (*nēros*, humid: *Gr.*), in Botany, a genus of plants, nat. ord. *Apocynaceæ*. The species are shrubs or trees, and include the oleander.

NERVES (*nervus*, a nerve: *Lat.*), long white medullary cords, which pass in pairs from the brain and the spinal marrow, as instruments respectively of sensation and volition; of which nine pairs proceed from the brain, and thirty-one from the spinal chord. They spread over the body like a fine network. Formerly the word *nerve* meant a *sinew*: this accounts for the opposite meanings of the word *nervous*, which sometimes signifies strong and sinewy; sometimes weak and irritable. The nerves are often interwoven; and some of them have rounded masses termed *ganglia*. There are two systems of nerves:—1. Those of *animal life*, or the *cerebro-spinal* nerves, which convey impressions from the brain to the voluntary muscles, and are the media of sensation and voluntary motion; they are connected with the brain and with the spinal chord. 2. Those of *organic life*, the *ganglionic* or great *sympathetic* nerves, which are connected with the brain and spinal chord, or with the cerebro-spinal nerves, by very small filaments, and are furnished with numerous ganglia. The cerebro-spinal nerves contain, generally enclosed in the same sheath, the *centripetal filaments*, which convey impressions from their extremities to the brain, in the way of pain, &c.; and the *centrifugal filaments*, which convey the influence of the will from the brain to the voluntary muscles.

NER'VOUS FE'VER, a low fever, in which nervous symptoms or sensorial debility are particularly prevalent.

NER'VOUS SYS'TEM, the arrangement within an animal, of the brain, spinal marrow, and nerves: constituting the means of perception, volition, and muscular action. In some of the lowest organized animals, the nervous system consists of mere filaments, which, in those a little higher, are connected with a nerveus ring surrounding the œsophagus; as organization advances, the ring gradually forms a brain, and ganglia are produced on the filaments. When the principal gangliated filaments are not parallel or symmetrical, the organization is that of the *heterogangliate* or molluscous animals. When there are two gangliated filaments, which are symmetrical, and run parallel along the ventral aspect of the body, they indicate the *homœogangliate* or articulate animals. When the brain is no longer a ring, but sends down the back a prolongation of its substance, termed the spinal marrow, the organization is that of the *myelencephalous* or vertebrate animals, the primary division of the animal kingdom. In articulate and vertebrate animals, the superficial portion of the ventral or spinal chord is 'sensitive,' the deep-seated 'motive.'

NESTO'RIANS, in Ecclesiastical History, the followers of Nestorius, patriarch of Constantinople, in the first half of the fifth century. He carefully distinguished the two natures of Christ, but affirmed that the human nature was inhabited by the divine, as a temple by its divinity. He asserted that the virgin was merely the mother of *Christ* or *man*. His opinions, which spread through Asia, were soon after counteracted by the opposite heresy of the Eutychians. [See MONOPHYSITE.] He was deposed by a council held at Ephesus in 431, and died in exile in upper Egypt.

NET, or **NEAT** (*nett*: *Ger.*; from *nitidus*, pure: *Lat.*), in Commerce, that which is without adulteration or deduction. Hence we say *neat wines*, &c.; and *net produce*, or that which a commodity has yielded, after all *tare* and charges have been deducted.

NETH'INIMS (given or offered: *Heb.*), among the Jews, the 'hewers of wood and drawers of water;' they were the descendants of the Gibeonites, condemned by Joshua; and of the Canaanites, who had surrendered themselves and were spared.

NET'TINGS, in a ship, a sort of gratings made of small ropes brought together with rope-yarn or twine, and fixed on the quarters, tops, &c., for various purposes—among others, to prevent boarding.

NET'TLE, the popular name of well-known plants of the genus *Urtica*, nat. ord. URTICACEÆ. The species are chiefly herbaceous, and are usually covered with extremely fine, sharp, tubular hairs, placed upon minute vesicles filled with an acrid and caustic fluid, which, by pressure, is injected into the wounds caused by the sharp-pointed hairs; hence arises the well-known stinging sensation when these plants are incautiously handled. The nettle is not so useless as it appears. The young leaves, when boiled, are a good substitute for cabbage; the fibres of the stem have been woven into coarse stuffs; jockeys mix the seed with the food of horses, in order to give them a sleek coat; and the roots, when washed, and mixed with alum or common salt, afford a yellow dye. It is a wholesome food for horned cattle when young.

NET'TLE-RASH, an eruption on the skin, resembling that produced by the sting of a nettle. It goes off, or changes its place, most usually in a few hours; and is relieved by bathing the part affected with very weak vinegar, and by the use of mild aperients.

NEURAL'GIA (*neuron*, a nerve; and *algos*, pain: *Gr.*), an acute, and generally intermittent, painful sensation along the course of the nerves. One of its most distressing forms is *tic douloureux*.

NEUROL'OGY (*neuron*, a nerve; and *logos*, a description: *Gr.*), in Medicine, a description of the nerves of animal bodies; or the doctrine of the nerves.

NEUROP'TERA (*neuron*, a nerve; and *pteron*, a wing: *Gr.*), an order of insects, composed of those possessing four membranous wings, traversed by a close network of veins. In some groups the organs of the mouth are rudimentary, but usually they form a complete biting apparatus. The abdomen has no terminal ovipostor, as amongst the Hymenoptera. The metamorphosis is sometimes complete, sometimes incomplete. To this order belong the Stone fly, May fly, the Dragon flies, Scorpion flies, and Caddice flies.

NEURO'SES (*neuron*, a nerve: *Gr.*), in Medicine, nervous disorders.

NEUROT'OMY (*neuron*, a nerve; and *temno*, I cut: *Gr.*), in Anatomy, the cutting or dissecting of the nerves.

NEU'TER (neither: *Lat.*), in Grammar, the gender of nouns which are neither masculine nor feminine.——NEUTER VERBS, by some grammarians called *intransitive verbs*, are those which govern nothing, and are neither active nor passive. When the action expressed by the verb does not pass to any object, the verb is said to be neuter; as, I *sleep*, we *walk*, they *stand* still.——NEUTER, the name given to the labourers of the honey-bee, before it was found that they were essentially females, though infertile.

NEUTRAL'ITY (*neutralis*, neutral: *Lat.*): in International Law, a nation which does not take part, directly or indirectly, in a war between other nations is said to be neutral. Certain rights and obligations towards the belligerents arise; and through the infraction of these, the neutral power frequently becomes involved in hostilities with one or the other of them. A neutral nation has the right to furnish either of the contending nations with all supplies which do not fall under the description of *contraband of war*, and to conclude treaties unconnected with the subject of the war; also, though this rule is sometimes set aside by the necessities of a powerful belligerent, to carry the property of any one of the hostile nations in its vessels, and under the security of its flag.

NEUTRALIZA'TION (same *deriv.*), in Chemistry, the combination of any two elements, but particularly of an acid and alkali, in such proportions that the properties of each are rendered inert. If either substance is in excess, its properties will be perceptible; which may be the case when the whole is really combined: thus we have both *acid* and *neutral* salts.

NEWS'PAPER. In the time of the Roman emperors, periodical notices of passing events, having the name of *acta diurna* (daily events), were compiled and distributed. The first newspaper published in modern Europe made its appearance at Venice in 1536, but the jealousy of the government would not allow of its being printed, so that, for many years, it was circulated in manuscript! It would seem that newspapers were first issued in England, by authority, in 1588, during the alarm occasioned by the approach of the Spanish armada to our shores, in order, as was stated, by giving real information, to allay the general anxiety, and to hinder the dissemination of false and exaggerated statements. From this era, newspapers, of one sort or other, have, with a few intermissions, generally appeared in London, sometimes at regular and sometimes at irregular intervals. For more than a century past they have gone on gradually increasing in size, as well as in commercial and political importance. In 1864 there were 1250 newspapers published in the United Kingdom; viz. in England 919, in Wales 37, in Scotland 140, in Ireland 140, and in the British Isles 14. There were 46 daily newspapers published in England, 1 in Wales, 9 in Scotland, and 14 in Ireland. No person may, under a penalty of 50*l.* per day, print or publish, or cause to be printed or published, any newspaper, until a declaration in writing has been delivered to the stamp office, or to the proper office of the district, stating the correct title of the newspaper, the true description of the house in which it is to be printed, and also of that in which it is to be published; the true names, &c., of every printer, publisher, and—with certain qualifications—every proprietor; signed by the printers and publishers mentioned in it, and by such proprietors as reside in the kingdom: and any false statement in it is a misdemeanor. And, under a penalty of 20*l.*, a copy of each publication must be delivered at the ordinary price to the head office of stamps, with the name and abode of the printer or publisher, written with his own hand, or by some person by his direction. And this, if required, must be produced, at any time within two years, as evidence in a court. Newspaper reporting has been brought to the highest degree of perfection. A staff of reporters is required for the House of Lords, and another for the House of Commons, by any journal which does not abridge or copy. As soon as one of them has attended for a certain short period, he retires to write out his notes and forward them to the compositors, being succeeded by another; so that, very frequently, one part of a speech is in type while a member is delivering the remainder. [See PRINTING.]

NEW STYLE, the method of reckoning the days of the year in accordance with the Gregorian calendar, which adjusts the odd hours and minutes by which the earth's revolution exceeds 365 days. [See CALENDAR.]

NEWTO'NIAN SYS'TEM, or **PHILOS'OPHY**, a phrase applied by some to the Copernican or solar system, which, however, was generally adopted before Newton's time; and by others principally to the laws of planetary motion, first promulgated by Kepler and Hooke; but strictly applicable only to certain geometrical and analytical demonstrations of those known laws, as developed by the genius and industry of Sir Isaac Newton, and chiefly to the theory of *universal gravitation*. The principal parts of the Newtonian philosophy are explained by the author in his 'Principia.'

NICE'NE CREED, a particular creed, or confession of faith, drawn up by the clergy in the council of Nice, in 325. It has been adopted by the church of England, and is printed in the Communion Service in the Book of Common Prayer.

NICHE (*Fr.*), in Architecture, a hollow or recess in a wall, for the reception of a statue or bust.

NICK'EL (a worthless person: *Ger.*), a metal which miners, being disappointed in not finding it to be copper, as they expected from the colour of its ore, in contempt called *kupfernickel* (worthless copper). It is white, ductile, and malleable; it may be drawn into wire, or rolled into plates, but a very small quantity of arsenic destroys its ductility. It is attracted by the magnet, and, like iron, may be magnetized. Its spec. grav., when hammered, is 8·82. It is somewhat more fusible than iron; is not affected by air or moisture at ordinary temperatures, but is slowly oxidized at a red heat. It is found in meteoric iron, but is obtained chiefly from kupfernickel, its sulphuret, and the ores of cobalt, with which it is associated. Its equivalent is 29·6. It forms salts with sulphuric and hydrochloric acids.

NICK'EL SIL'VER, an alloy frequently used in the manufacture of white metal spoons and forks, composed of 60 per cent. of copper, 17½ per cent. of zinc, and 22½ per cent. of nickel.

NIC'OL PRISM, a prism of Iceland spar, used in the examination of the phenomena of polarized light.

NIC'OTINE, in Chemistry, a highly poisonous alkaloid obtained from tobacco. It derives its name from *Nicotiana Tabacum*, the botanic term for tobacco; which was so called from Nicot, a Frenchman, who introduced it into France about the year 1560.

NICTA'TING, or **NICTITA'TING MEM'BRANE** (*nicto*, I wink: *Lat.*), a thin skin attached to the eyes of birds, and serving to clear them of extraneous matters.

NIDIFICA'TION (*nidus*, a nest; and *facio*, I make: *Lat.*), the act or operation of building a nest, and the hatching and feeding of young in the nest.

NI'DUS (a nest: *Lat.*), a term applied by naturalists to any place in which eggs are hatched or larvæ nursed, or in which seeds germinate.

NIEBELUN'GEN LIED, or **NIEBEL'UNGENS NOT**, a Teutonic epic poem of about 10,000 verses, probably written in the 13th century, although a much higher antiquity has been claimed for it. Possibly the stories of which it is composed had been passing for many ages through the mouths of the people. The poem relates the adventures of one Siegfried, son of a king on the Lower Rhine; but the chief heroes seem to be Attila king of the Huns, and Dietrich king of the Goths. There are dragons, dwarfs, enchanted maidens, magical swords, and all the other marvels of the dark ages. The poem has been rendered into modern German.

NIEL'LO WORK, an old method of ornamenting silver articles, by tracing thereon any kind of design with the graver, and filling up the lines with some hard black metallic paste or alloy. This was called *nigellum* (diminutive of *niger*, black: *Lat.*), and then *niello* by the Italians. In this way church plate, sword-hilts, clasps, and other articles were decorated, and such objects are eagerly sought for by collectors. Impressions taken by the old artists themselves with some black fluid on paper, as well as impressions on sulphur, are also to be found in the cabinets of the curious.

NI'GHTINGALE (*Nachtigall: Ger.*), in Ornithology, a migratory species of passerine birds, a type of the sub-genus *Philomela*. The nightingale is more remarkable for the sweetness of its note than for its beauty. It is of the size of the linnet, but in shape it more resembles the redbreast; the head is small; the eyes are large, and their iris pale; the beak is dusky, slender, and moderately long; the head, neck, and back are of a greyish-brown; the upper parts of the wings, and about the tail, have also a reddish tinge, and the throat, breast, and belly are of a pale ash colour. This bird is well known in the southern counties of England for the fineness of its tones, especially in the evening. The males arrive there sometimes in April, but more usually in May; the females, a week or ten days after the males. It is equalled only by the skylark in variety, compass, and execution; but the latter is greatly inferior in mellowness and plaintiveness, in which two qualities the woodlark alone approaches the nightingale. It is the constant theme of the eastern poets; and is represented by them as attached, in a most extraordinary degree, to the *rose*, their favourite flower. It is very generally believed that the nightingale will live but a very short time in a state of confinement; this, however, is a mistake.

NI'GHTMARE. [See INCUBUS.]

NI'GHTSHADE, or **DEADLY NIGHTSHADE.** [See ATROPA.]

NI'GHTSHADE, WOODY. [See BITTERSWEET.]

NI'HIL, or **NIL** (*Lat.*), nothing.——*Nil capiat per breve* (he is to receive no benefit from the writ), in Law, the judgment given against the plaintiff in an action, either in bar thereof, or in abatement of the writ.——*Nihil debet* (he owes nothing), the usual plea in an action of debt; but it is no plea in an action of covenant, in a breach assigned for non-payment of rent, &c.——*Nil dicit* (he says nothing), a failure of the defendant to put in an answer to the plaintiff's declaration, &c., by the day assigned for that purpose, which omission causes judgment to be had against him.——*Nihil habuit in tenementis* (he has no interest in the tenement), a plea that can be allowed only in an action of debt brought by a lessor against a lessee without deed.

NIM'BUS (a rain-cloud: *Lat.*), in Meteorology, a word used to express the combination of clouds which condense into rain. [See CLOUD.]——In Art, the circle of luminous rays, placed by painters round the heads of the persons they represented, as a mark of divinity or sanctity. The nimbus of any person of the Trinity is distinguished by four rays at right angles to each other, one of the rays being concealed by the head. The nimbus is sometimes square, lozenge-shaped, or triangular.

NI'SI PRI'US, in Law, a term often given to trials by jury in civil actions. By it is meant a commission directed to the judges of assize, empowering them to try all questions of fact issuing out of the courts of Westminster, that are then ready for trial; and as all causes are heard at Westminster, the clause is added in such writs, *Nisi priùs justiciarii domini regis ad assisas capiendas venerint*—that is, Unless before the day fixed the justices come thither to hold assizes—whence the writ, as well as the commission, have received the name.

NI'TRATE OF SIL'VER, in Chemistry, a compound of nitric acid and oxide of silver. It is prepared by dissolving as much pure silver as possible in pure nitric acid, evaporating the solution and crystallizing the nitrate. When melted and cast in a mould it is called lunar caustic, which is employed in surgery to destroy abnormal growths, reduce local inflammation &c. When swallowed, it is a powerful poison; the antidote is common salt, which, if used in time, converts it into an insoluble, and therefore a harmless chloride. It is an ingredient in marking ink [see INK], and a substance of great importance in photography, which see.

NI'TRATES, in Chemistry, salts formed of nitric acid with salifiable bases, as nitrate of potash, soda, &c.

NI'TRE (*nitron: Ger.*), *Saltpetre*, a salt termed by the chemists nitrate of potash. It is found on the surface of the ground in several parts of the world, but particularly in India, whence all the nitre used in Great Britain is obtained. It may be produced in 'nitre beds,' formed of a mixture of calcareous soil and animal matter. The earth containing it is collected and thrown into water, which dissolves out the salt; when the fluid clears, it is run off, and is evaporated by the heat of the sun. The nitre thus obtained is purified by solution and recrystallization. This salt crystallizes in six-sided prisms, containing no water of crystallization. It is soluble in seven parts of cold, and in less than its own weight of boiling water. It has a cooling saline taste, and is decomposed at a red heat. Medicinally it acts on the kidneys and on the skin. It is highly important as an ingredient in gunpowder, for which purpose nitrate of soda, though abundant, cannot be used, as it is slightly deliquescent. [See GUNPOWDER.] It is also one of the sources of nitric acid.

NI'TRIC A'CID, a compound consisting of one atom of nitrogen, and five of oxygen. In ordinary circumstances, it cannot exist except in combination at least with water: the nitric acid of the shops, termed *aqua-fortis*, is united with more or less of that fluid. It is colourless, unless it contains nitrous acid; exposed to the light, it gradually becomes of a yellow or reddish tint, according to the quantity of nitrous acid formed by decomposition of the nitric acid. It is intensely corrosive, produces painful sores if brought in contact with the animal body; and, though removed with great rapidity, stains the skin and nails yellow. It is a powerful oxidizing agent, dissolving most of the metals, after oxidizing them; but it is worthy of notice that when its spec. grav. is 1·485, it has not the least action on tin, though, if stronger or weaker, it oxidizes it rapidly, nitrous gas being evolved with almost explosive violence. It has very recently been obtained in the anhydrous state, which chemists long considered to be impossible; it is in the form of six-sided prisms, which are perfectly clear and colourless; they become very hot in water, and dissolve in that fluid without imparting to it any colour or disengaging any gas. Nitric acid is obtained by acting on nitrate of potash, or nitrate of soda, with sulphuric acid, and distilling off the acid which is set free.

NI'TROGEN (*nitron*, nitre; *gennao*, I produce: *Gr.*), an elementary gas, which forms about four-fifths of our atmosphere, the remaining fifth being oxygen. The two are mechanically mixed, not chemically combined. It is invisible and elastic. It immediately extinguishes animal life, whence its name *azote* (*a*, not; *zoe*, life: *Gr.*). It cannot support combustion, and a lighted candle immediately ceases to burn if placed in it. It has no taste. It is absorbed very sparingly by water, and is a little lighter than atmospheric air, its specific gravity being ·9718. It is capable of combining with oxygen, and with different proportions of this substance forms gaseous oxide of azote or nitrous oxide, nitric oxide, hyponitrous acid, nitrous acid, and nitric acid. Combined with hydrogen, it forms ammonia; and it enters into the composition of most animal substances.

NI'TRO-MURIAT'IC A'CID, in Chemistry, a compound of nitric and muriatic acids—the *Aqua regia* of the alchemists—which has the property of dissolving gold and platina. It is more correctly termed *nitro-hydrochloric* acid.

NI'TROUS OX'IDE, a gas which, if respired, produces a sense of exhilaration and intoxication. It is popularly called *laughing-gas*, because it causes a certain degree of pleasurable excitement, often accompanied by laughter, in those who inhale it. It is protoxide of nitrogen, and is obtained by heating nitrate of ammonia, which is resolved into this gas and water. If breathed too long, or if it is not quite pure, it may produce serious consequences when respired; even when pure, its effects are not the same with persons of different temperaments. The intoxication which it ordinarily produces is not followed by languor, or, generally speaking, by any bad effect.

NIZAM', the title of one of the native sovereigns of India. It was derived from Nizam-ul-Mulk, who, in the commencement of the last century obtained possession of the Mahometan conquests in the Deccan; and his successors assumed his name as a title of dignity.

NO'BILES (literally those who are known: *Lat.*), among the Romans, were such as possessed the *jus imaginum*, or the right of having the pictures or statues of their ancestors; a right which was allowed only to those whose ancestors had borne some curule office, that is, had been curule ædile, censor, prætor, or consul. For a long time, none but the *Patricii* were *nobiles*, because no person under that rank could bear any curule office. The first of any family who was raised to a curule dignity was termed *novus homo* (a new man), an upstart. Catiline reproached Cicero with being such. The Roman nobility, by way of distinction, wore a half-moon upon their shoes, especially those of patrician rank.

NOBIL'ITY (*nobilitas*: *Lat.*), rank conferred by express authority of the governing power. British nobility consists only of five degrees, viz. that of a duke, marquis, earl, viscount, and baron [each of which see under their proper terms]. In Britain these titles are conferred by the sovereign only, and by letters patent, which mark out the course of descent. The privileges of the nobility are very considerable; they are all esteemed hereditary counsellors of the crown, and are exempt from all arrests, unless for treason, felony, breach of the peace, condemnation in parliament, and contempt of the sovereign authority. They enjoy their seats in the house of peers by descent [see PARLIAMENT], and no act of parliament can pass without their concurrence; they constitute the supreme court of judicature, and even in criminal cases give their verdict upon their honour, without being put to their oath. An hereditary nobility is found in the infancy of most nations, ancient and modern. Its origin is to be attributed to various causes, for the most part to military tenures; in some cases, to the honours paid to superior ability, or to the guardians of the mysteries of religion. The priestly nobility of antiquity has everywhere yielded to the superiority of military chieftains. In France and Germany, the origin of hereditary nobility dates from the downfall of the Carlovingian dynasty; in England, from the conquest of the Normans, in the tenth and eleventh centuries; it afterwards spread over all Europe, for, since that time, dignities, as well as lands, have become hereditary. There is no nobility in the United States, Norway, or Switzerland.

NO'BLE in Numismatics, a gold coin, value 6s. 8d., struck in the reign of Edward III., and stamped with the impression of a ship, which emblem is supposed to have been commemorative of a naval victory obtained by Edward over the French at Sluys, in 1340.

NOCTILU'CA (something that shines by night: *Lat.*), a name given by some of the older chemists to *phosphorus.*——It is also the name of a phosphorescent marine animal of microscopic dimensions.

NOC'TURN (*nocturnus*, pertaining to night: *Lat.*), one of the parts into which the matins in the Roman Catholic breviary are divided. The matins generally consist of three nocturns, of which the first contains three lessons from Scripture, and three psalms; the second, three lessons constituting the life of the saint, with three psalms; and the third, three lessons from some homily on the gospel of the day, with three psalms. [See HOURS, CANONICAL.] On rare occasions there is but one nocturn, which is considered a great advantage; and seems generally meant as a privilege, since it occurs, ordinarily, in a great festival only, and the week following it is termed its *octave.*

NODE (*nodus*, a knot or prominence: *Lat.*), in Surgery, a tumour on a bone which causes great pain, and is often attended by caries or necrosis.——NODE, in Dialling, a point or hole in the gnomon of a dial, by the shadow or light of which are shown the hour of the day, the parallels of the sun's declination, &c.

NODES (same *deriv.*), in Astronomy, the two points in which the orbit of a planet intersects the ecliptic. That by which the planet passes from the south to the north side of the ecliptic is termed the *ascending node;* the other the *descending node.* The straight line which joins these two points, and is formed by the intersection of the plane of the planet's orbit and that of the ecliptic is called the *line of the nodes.* In all the planetary orbits, the line of the nodes has a retrograde motion from east to west; but it amounts to only a few seconds in a year. It is a necessary consequence of the mutual attraction of the heavenly bodies.

NO'LI ME TAN'GERE (touch me not: *Lat.*), in Botany, the specific name of a balsam, a British plant belonging to the genus *Impatiens.*——In Art, a name given to pictures, which represent Christ appearing to Mary Magdalen after the resurrection.

NOLLE PROS'EQUI (to be unwilling to prosecute: *Lat.*), a legal term signifying a proceeding in an action, by which the plaintiff undertakes not to proceed further. If entered before judgment, the plaintiff may bring another action for the same cause against the same defendant.

NOM'ADS, or NOM'ADES (*nomades*, from *nomos*, pasture: *Gr.*), a name given to nations whose chief occupation consists in feeding their flocks; and who have no fixed place of abode, but shift their residence according to the state of pasture. Nomadic tribes are seldom found to abandon their wandering life, until they are compelled to do so by being surrounded by those who reside in fixed habitations, or unless they can make themselves masters of the settlements of a civilized nation.

NOM'BRIL (the navel: *Fr.*), in Heraldry, the centre of an escutcheon.

NOM DE GUERRE (literally, a *war name*), a French term commonly used to denote an assumed or fictitious name.

NOME (*nomos*, from *nemo*, I distribute: *Gr.*), the name for those provinces into which Egypt was divided from the earliest period. In the time of Strabo they were 36 in number; 10 in the Thebaïd; 16 in the Heptanomis, or intermediate district; and 10 in the Delta.

NOMENCLA'TOR (*nomen*, a name; and the obsolete *calo*, I call out: *Lat.*), in Roman Antiquity, a slave who attended upon persons that stood candidates for offices, and prompted or suggested to them the names of all the citizens they met: in order that they might address them by name, which was esteemed an especial act of courtesy.

NOMENCLA'TURE (*nomenclatura*, from same: *Lat.*), a systematic classification of words, which designate the divisions and dependencies of a science.

NOM'INATIVE (*nominativus*, from *nomino*, I name: *Lat.*), in Grammar, the first case of nouns that are declinable. The nominative case is the subject of a proposition or affirmation; thus, in the sentence 'the house is repaired,' *house* is the nominative case of the noun.

NON (not: *Lat.*), a word used in the English language as a prefix only, for giving a negative sense; as in *non*-ability, *non* residence, *non*-payment, *non*-appearance, and the like.——*Non assumpsit* (he has not undertaken), in Law, a general plea in a personal action, by which a man denies that he has made any promise.——*Non compos mentis* (of unsound mind: *Lat.*), a phrase used to denote that a person is not of sound memory and understanding. A distinction is made between an idiot and one *non compos mentis*, the former being constitutionally destitute of reason, the latter deprived of that with which he was naturally endowed; but, in many cases, the law makes no distinction between the two.——*Non distringendo* (not distraining), a writ granted to prevent distraining.——*Non est inventus* (he has not been found), the answer made by the sheriff in the return of the writ, when the defendant is not to be found in his bailiwick.——*Non liquet* (it does not appear), a verdict given by a jury, when a matter is to be deferred to another day of trial.——*Non obstante* (notwithstanding), a clause in statutes and letters-patent, importing a license from the king to do a thing which at common law might be legally done, but, being restrained by act of parliament, cannot be done without such license.——*Non pros*, or *Nolle prosequi* (is unwilling to proceed further), a term made use of to signify that the plaintiff will proceed no further in his action, being convinced that he cannot support his cause. In criminal cases, it can be entered only by the attorney-general.

NON'AGE, the period of life preceding the time when a person, according to the laws of his country, becomes of age to manage his own concerns.

NON'AGON (*novem*, nine: *Lat.*; and *gōnia*, an angle: *Gr.*), in Geometry, a figure having nine angles and therefore nine sides.

NON-CONDUC'TOR, a substance or fluid which does not conduct or transmit another substance, or fluid, or motions, or which transmits them with difficulty. Thus, glass is a non-conductor of electricity; wool is a non-conductor of heat. [See ELECTRICITY, HEAT.]

NONCONFOR'MIST, one who refuses to conform to the rites and worship of the established church. The name was at first particularly applied to those clergymen who were ejected from their livings by the act of uniformity in 1662. [See DISSENTERS.]

NONES (*nonæ*, from *nonus*, the ninth: *Lat.*—because the ninth day before the *ides*), in the Roman calendar, the fifth day of the months January, February, April, June, August, September, November, and December; and the seventh of March, May, July, and October; these last four months having six instead of four days before the nones, because they alone, in the ancient constitution of the year by Numa, had thirty-one days each, the rest having only twenty-nine, and February thirty; but when Cæsar reformed the year, and made other months contain thirty-one days, he did not allot them six days of nones. The nones, like the calends and ides, were reckoned backwards.——NONES, one of the *canonical hours* of the Roman Catholic breviary, anciently appointed to be said at the *ninth* hour of the twelve into which the Romans divided the day, corresponding, at the equinoxes, with our three o'clock. It may be recited, at present, at almost any part of the day.

NON-JU'RORS, the adherents of James II., who refused to take the oath of allegiance to the government at the Revolution, when James abdicated and William and Mary were placed on the throne.

NON-NAT'URALS. Under this term, ancient physicians comprehended air, meat and drink, sleep and watching, motion and rest, the assimilated substances and excretions, and the affections of the mind; or, in other words, those matters which do not enter into the composition of the body, but at the same time are necessary to its existence.

NON-RESIST'ANCE, in English Constitutional History, unqualified obedience to every command, especially of the sovereign, whether he orders what is right or wrong.

NON'SUIT, in Law, the renunciation of a suit by the plaintiff. It is either *adjudged*, on account of some neglect, delay, &c., in the prosecution of the suit, or it is *voluntary*. It is usual to call on the plaintiff, when he is unable to make out a case to support his pleadings for want of the necessary evidence, and the jury are about to give a verdict, to choose a nonsuit. He does this by *withdrawing*, neither answering by himself nor another, when, previously to the delivery of the verdict, the crier *calls the plaintiff*. Except in certain cases, a nonsuit does not prevent the bringing of another action, for the same cause When a plaintiff is nonsuited, he is obliged to pay the costs of his adversary.

NOON (*non: Sax.*), *mid-day*, or twelve o'clock, called *apparent* as shown by a sun-dial, and *real* as shown by a clock.

NOR'THERN LIGHTS, the *Aurora Borealis*, which see.

NORTH POLE (*nord: Ger.*), in Astronomy, a point in the northern hemisphere of the heavens, ninety degrees every way distant from the equinoctial.——NORTH-POLE STAR, a star in the tail of *Ursa minor*, so called from its not being more than two degrees and a half distant from the pole.

NORTH'-WEST PAS'SAGE. The 'North Polar Expeditions' undertaken by the enterprising mariners of England, after the year 1496, when Cabot penetrated into Hudson's bay, had continued to increase in interest with every fresh attempt, till, at length, parliament offered a premium of 20,000*l.* to the first navigator who should accomplish the north-west passage, and 5000*l.* to the first vessel which should reach the north pole and pass it In 1819, the prince-regent offered prizes of from 5000*l.* to 15,000*l.* to those vessels which should advance to certain points in the Arctic seas; the British government having the year before fitted out two expeditions to the north pole. Captain Buchan, commanding the *Trent* and the *Dorothy*, was instructed to attempt a passage between Spitzbergen and Nova Zembla, over the pole into the Pacific, and Captain Ross, commanding the *Isabella* and the *Alexander*, to attempt the north-western passage from Davis's straits and Baffin's bay into the Frozen ocean, and thence into the Pacific. Captain Buchan, however, reached only 80° 32′ north of Spitzbergen, where he remained three weeks frozen in: while the chief geographical result of Captain Ross's expedition was the more accurate determination of the situation of Baffin's bay; for, although he sailed up Lancaster sound, he did not continue his progress far enough to discover that it was open. The British government, therefore, in 1819, sent out Lieutenant Parry, who had accompanied Captain Ross, on a second voyage into Baffin's bay. He penetrated with his vessels, the *Hecla* and *Griper*, through Lancaster sound into Barrow's strait, in which he examined Prince Regent's inlet, running in a southern direction, and the polar sea; and wintered in the harbour of an uninhabited island, which he called *Melville island* (74° 45′ lat.). As he had passed (Sept. 10) 110° W. long. of Greenwich, he was entitled to the first prize offered by parliament. With eleven companions he explored Melville island, and reached (June 6) the northern coast (75° 34′ 47″ lat. and 110° 36′ 52″ long.). Having gone as far as 113° 46′ 43″ long. and 74° 27′ 50″ lat., he returned, in consequence of the immense fields of ice, through Davis's straits to Britain. While Parry and Ross were seeking for a north-west passage into the polar sea, Captain Franklin was sent by the British government to penetrate to the northern coast of America by land, along Hudson's bay and Coppermine river. In May, 1824, government fitted out a third polar expedition for the discovery of a north-west passage through Prince Regent's inlet, under Parry and Lyon. Storms and icebergs drove the ships ashore, and it became necessary to abandon one of them, the *Fury*. In 1825, Capt. Franklin undertook a new journey overland, with the intention of sailing westerly from Mackenzie's river along the coast to Behring strait. At the same time Captain Beechey sailed in the *Blossom* by the way of Cape Horn, to discover an easterly passage round the Icy cape, or in Kotzebue sound. In six months Franklin reached the Northern ocean, near Garry's island (69° 30′ lat), and returned upon the Mackenzie to his winter quarters at Fort Franklin, on Great Bear lake. Both parties left their winter quarters June 21, 1826, and shortly after separated in 67° 38′ lat. and 133° 52′ W. long., Franklin descending the western arm of the Mackenzie, which runs along the foot of the Rocky mountains.—The admiralty now sent Captain Parry, in the *Hecla*, to reach the north pole. He took reindeer and ice-boats on board at Hammerfest, in Lapland; reached Spitzbergen May 27, 1827; left the *Hecla* there in the ice; sailed June 21, with two boats, through an open sea; left the boats on the 24th, and began (81° 12′ 51″) his journey over the ice to the north pole. But he reached only the latitude of 82° 45′ 15″; and the ice being everywhere broken, he was obliged to return.—In the spring of 1829, Captain Ross, chiefly through the liberal assistance of Felix Booth, Esq., sheriff of London, undertook a private expedition into the Polar seas, with a view to determine the practicability of a new passage by Prince Regent's inlet, which had been confidently said to exist. This voyage was perilous in the extreme; and no authentic intelligence was received of the expedition, from the 27th of July, 1829, the day it sailed from Wideford, in Greenland, where it had put in to refit, till August, 1833, when the commander and crew were discovered on the south shore of Lancaster sound, by Captain Humphreys, of the *Isabella*, of Hull, the very ship which Captain Ross had formerly commanded. Our space compels us to pass over the subsequent attempts to effect the discovery of the north-west passage, till 1845, when Sir John Franklin with a gallant crew volunteered on this perilous undertaking. On the return of the Arctic Discovery Squadron, under Captain Sir J. C. Ross, from its unsuccessful operations to discover Sir John Franklin, whose fate remained a mystery, in 1848 and 1849, it was at once determined by government to re-equip the *Enterprise* and *Investigator*, in order that they might resume the search by the way of Behring strait. Accordingly these two ships sailed from Plymouth on January 20th, 1850. They unfortunately did not succeed in finding Captain Franklin, but they saw, across the entrance of Prince of Wales's strait, the frozen waters of Melville sound, and thus obtained the object of so many expeditions. After spending a fourth winter in these desolate regions, Captain McClure returned to England, and received 10,000*l*., the reward which had been promised for the successful discovery of the north-west passage, together with the honour of knighthood. A record was subsequently found by Captain McClintock on the north-west coast of King William island, stating that on the 22nd of April, 1848, the *Erebus* and *Terror* had been abandoned in the ice, and that the survivors, 105 in number, were proceeding to the Great Fish river, under the command of Captain Crozier, Sir John Franklin having died on the 11th of June, 1847.

NOSOL'OGY (*nosos*, a disease; and *logos*, a discourse: *Gr.*), an arrangement of diseases, with names and definitions, according to the distinctive character of each class, order, genus, and species.

NOSTAL'GY (*nostalgeo*, I pine for my home: *Gr.*), home sickness, *le mal du pays*; a vehement desire to return to one's native country, attended with melancholy, want of appetite, and other symptoms indicative of a restless and unhappy state of mind.

NOS'TOC, cryptogamic plants, of which the commonest species is often called star-jelly. It is a trembling, gelatinous, substance, found on pastures, gravel walks, &c., in rainy weather; but it soon dries and shrivels up almost to nothing. Paracelsus, who, it is said, gave it the name, attributed wonderful properties to it. Being supposed to fall from the sky with meteors, it obtained, in Sweden, the name of 'sky-fall;' and in England, as well as some of the liverworts, that of 'witches' butter.' Some species form an article of food in China, and one was similarly employed in a late Arctic expedition.

NOTA'TION (*notatio*: *Lat.*), the recording of anything by marks, figures, or letters. Mathematical notation relates to number and quantity, or to operation. The system of numerical notation, now universally adopted by civilized nations, owes its admirable simplicity to the giving both an *absolute* and a *local* value to the characters. Thus, the absolute value of 5 is five: this is never changed. Its local value depends on its position with regard to the decimal point: thus 50· means five tens; 500· five hundreds, &c.: ·05 five hundredths; ·005 five thousandths, &c. These principles, with the power of combining the few characters employed, enable us to express the most enormous numbers with the greatest ease, and impart the utmost simplicity to the very language we use regarding them. This system, usually termed the *Arabic*, is far more perfect and convenient than that of any nation of antiquity, however enlightened. The symbols of quantity are arbitrary, but the letters of the alphabet are almost exclusively employed: the first, as a, b, c, &c., to indicate *known quantities*; and the last, x, y, and z, to indicate *unknown*. In selecting a letter, we sometimes choose it so as in some measure to assist our memory: thus we usually indicate momentum by M, velocity by V, &c.;

and different momenta with different M's: thus, one momentum by M, another by M′, or *m*, &c. *Symbols of operation* contribute much to simplicity and the saving of time: thus it is easier to write $a+b=c$, than *a* added to *b* is equal to *c*. In performing an operation, or verifying it, we proceed far more easily with symbols than we could possibly do if the various processes were described by words. There are many symbols used to indicate processes; but the following are the most common. + for addition; as $a+b$, *a* plus *b*, or *a* to be added to *b*. − for subtraction; as $c-d$, *c* minus *d*, or *d* to be subtracted from *c*. × for multiplication; as $x \times y$, *x* multiplied by *y*:—when the multiplication is supposed to be actually performed, the sign is omitted: thus, $x\,y$ means the product of *x* and *y*. ÷ for division, as $m \div n$, *m* divided by *n*:—when the division is supposed to be actually performed, the quantities may be put down thus, $\frac{m}{n}$. = for equality; as $p=q$, *p* is equal to *q*. Two dots indicate the ratio between two quantities; as $a:b$, *a* is to *b*. Eight dots indicate proportion; as $a:b::c:d$, *a* is to *b* as *c* is to *d*. √ is the radical sign, as $\sqrt{a}$, the square root of *a*, written also $a^{\frac{1}{2}}$; $\sqrt[4]{b}$, the fourth root of *b*, written also $b^{\frac{1}{4}}$, &c.

NOTE (*nota*, a mark: *Lat.*), in Music, a character which marks the pitch and the time of a sound. In general, under *notes* are comprehended all the signs or characters used in music, though in propriety the word only implies the marks which denote the degrees of gravity and acuteness to be given to each sound. [See MUSIC.]

NO′TICE (*notitia*, a knowledge: *Lat.*), in Law, a communication given, or received, which conveys the presumed or real knowledge required to affect the receiver with legal liabilities.

NOUN (*nomen*, a name: *Lat.*), in Grammar, a word that denotes any object of which we speak, whether it be animate, inanimate, or ideal; as *man*, *gate*, *mind*. Nouns form the basis of all language: thus we call a certain instrument a *saw*; the act of using it is *sawing*; and the verb is to *saw*.

NOVAC′ULITE (*novacula*, a razor: *Lat.*), in Mineralogy, the *Hone*, or *Turkey oil-stone*, a variety of argillaceous slate. It owes its power of whetting or sharpening steel instruments to the fine siliceous particles it contains. Various other stones are used as whetstones, such as mica slate, freestone, &c.

NOV′EL (*novella*: *Ital.*; from *novus*, new: *Lat.*), in Literature, a fictitious tale, or imaginary history of real life, generally intended to exhibit the operation of the passions, foremost among which is love. The novel and romance, though sometimes confounded, appear to be different. The former depicts life as it is in ordinary circumstances, and brings together incidents, any one of which has happened or may very fairly be supposed to have happened. Romances generally relate to periods long passed by; their incidents are often improbable, and sometimes impossible. The supposed adventures of chivalry form their favourite theme; and their scenes are most frequently laid in ancient castles and monasteries; they do not even reject the aid of imaginary beings, and of enchantment. Some of Sir Walter Scott's works hold in many respects an intermediate position: his delineation of real, though past manners, renders them novels; but the distant times of which he writes, and the wonderful, though perhaps always absolutely possible, incidents he so frequently introduces, bring them into the class of romances.——NOVEL (*novus*, new: *Lat.*), in Civil Law, a term used for the constitutions of several emperors. Those of Justinian are best known, and are generally understood by the term. They were so called, either from their producing a great alteration in the face of the ancient law, or because they were made on new cases, and, after the revisal of the ancient code, compiled by order of that emperor.

NOVEM′BER (*Lat.*, from *novem*, nine), the eleventh month of the Julian year, consisting of thirty days. It is the first winter month in the northern hemisphere, and the first summer month in the southern. Its name arose from its being the ninth month of the ancient Roman calendar.

NOV′ICE (*novitius*, fresh: *Lat.*), a person not yet skilled or experienced in an art or profession; among the Romans, it signified a recruit. The term is applied in monasteries to a religious person, in his or her novitiate, or year of probation, and who has not yet made the vows.

NOVI′TIATE, the period appointed for the trial of novices, or those who enter a monastery, in order to ascertain whether they have the qualifications necessary for living up to the rule to which they are to bind themselves by vow. The novitiate is generally very severe, the novice generally having to perform many menial offices about the convent, and to give an account of his most trifling actions to the master of the novices.

NU′CLEUS (a kernel: *Lat.*), anything round which matter has accumulated, or to which it is attached.——In Astronomy, the term *nucleus* is used for the body of a comet, otherwise called its head.——In ancient Architecture, *nucleus* signified the middle layer of a flooring, which consisted of a strong cement, over which they laid the pavement.

NUDE COM′PACT (*nudum pactum*, from *nudus*, naked: *Lat.*), in Law, a contract made without any consideration, and therefore not valid; the term is borrowed from the civil law.——NUDE MATTER, a bare allegation of something done.

NU′DITIES (*nuditas*, nakedness: *Lat.*), in Painting and Sculpture, those parts of the human figure which are not covered with drapery. The appearance of the covering being determined by the form of the body, it is essential to the painter, as well as the sculptor, to study the naked figure with the greatest attention.

NUG′GET (*niggot*, an old English word, perhaps a corruption of *ingot*), the miner's term for natural lumps of nearly pure gold. They are usually found in superficial accumulations of gravel, having been there deposited on the destruction of the parent rock. The largest nugget hitherto found weighed 184lb. 9oz. 6dwts., and received the name of the 'Welcome Nugget.' It was discovered in 1858, at a depth of 180 feet in drift matter at Ballarat, Victoria, and was sold for 10,500*l.* It was melted in London. Another, found at the same place, was named the 'Blanche Barkly,' and sold for 6905*l.* Several others have been found ranging in value from 3000*l.* to 6000*l.*

NU'ISANCE (*nuire*, to injure: *Fr.*), in Law, annoyances which are of two kinds, public and private. A *public nuisance* affects the king's subjects in general. A *private nuisance* is defined to be 'anything done to the hurt or annoyance of the lands, tenements, or hereditaments of another.' The remedy for public nuisances is by indictment or presentment; for private, by action of trespass on the case for damages; and the party annoyed may abate the nuisance by his own act, entering his neighbour's land, &c., if necessary for the purpose, but committing no riot.

NUM'BER (*numerus: Lat.*), in Arithmetic, an assemblage of several units or of several things of the same kind. *Cardinal* numbers express the amount, as 1, 2, 3, 4. *Ordinal* numbers denote the order, as 1st, 2nd, 3rd, &c. *Even* numbers are those which may be divided into two equal parts without a fraction being produced, as 6, 12, &c. *Uneven* numbers are such as leave a remainder after being divided by 2, as 5, 13, &c. A *rational* number is one commensurable with unity. A number incommensurable with unity is termed *irrational*, or a *surd.* A *square* number is the product of any number multiplied by itself, as 4, which is the product of 2 multiplied by 2. A *cubic* number is the product of a square number by its root: such is 27, as being the product of the square number 9 by its root 3. A *perfect* number is that whose aliquot parts added together make the whole number, as 6, 28, &c.: the aliquot parts of 6 being 3, 2, and 1=6; and those of 28 being 14, 7, 4, 2, 1=28, &c. An *imperfect* number is that whose aliquot parts added together make either more or less than the whole of it. *Homogeneal* numbers are those referred to the same units, those referred to different units being termed *heterogeneal.* Almost all civilized nations have chosen 10 as the common ratio of their numerical systems—that is, have made their systems of numbers *decimal.* This was not a matter of necessity; the only thing required was the selection for the common ratio of a number neither too small nor too large. Too small a ratio would require many places of digits to express even a moderate number, and too large a ratio would be laborious to the mind. It is unfortunate that our systems of money, weights, and measures not only do not follow the decimal system, but no one of them has even a common ratio.

NUM'BERS, the title of the fourth book of the Pentateuch, so called because it contains an account of the numbering of the people. It comprehends a period of the Israelitish history of about thirty-eight years.——NUMBERS, in Poetry, Oratory, Music, &c., are certain measures, or cadences, which render a verse, period, or song, agreeable to the ear. *Poetical numbers* consist in a certain harmony in the order and quantity of syllables constituting feet. *Rhetorical numbers* are a sort of simple harmony, less apparent than that of verse, but such as is perceived and affects the mind with pleasure.

NU'MERAL LET'TERS, the Roman capital letters which stand as substitutes for numerical characters: as I for 1, X for 10, L for 50, C for 100, &c.

NUMERA'TION (*numeratio: Lat.*), the art of reading any number expressed by characters; it is often confounded with notation, which is the art of expressing any number by characters.

NU'MERATOR (*Lat.*, from *numero*, I reckon), in Arithmetic, the quantity in the upper line of a fraction, denoting how many of the equal parts into which one or more integers are supposed to be divided, are taken. Thus, the 3 in ¾ shows that the integer having been divided into four equal parts, three of them are taken.

NUMISMAT'ICS (*numisma*, a coin: *Lat.*), or NUMISMATOL'OGY (*nomisma*, a piece of money; and *logos*, a description: *Gr.*), the science which has for its object the study of coins and medals of all nations, as an aid to history and a means of rectifying dates in chronology. The earliest coins are Phœnician, and were struck from dies unreversed, so that the inscription was reversed; but those struck by the ancient Greeks and Romans are most deserving our attention. The parts of a coin or medal are the *obverse*, or face, generally containing the bust, &c., of the sovereign in whose honour it was struck, or some emblematic design; and the *reverse*, containing various figures, &c. The words round the border constitute the *legend*, and those in the middle the *inscription*; when they occupy the lower extremity of the piece, and are separated from the rest by a horizontal line, they are termed the *exergue.* Coins struck in this country before the reign of Charles II. had their devices impressed by blows of the hammer. The lettering and milling on the edges of coins was invented to meet the fradulent practice of clipping and filing. The study of coins and medals is indispensable to archæology, and to a thorough acquaintance with the fine arts. They indicate the names of provinces and cities, and point out their position; and they afford representations of many celebrated places. They fix the period of events, and sometimes determine their character; and they enable us to trace the series of kings. They also give us the attributes and titles of different divinities, the utensils and ceremonies of their worship, and the costume of the priests. In fine, they afford information regarding many things connected with usages, civil, military, and religious; while they enable us to trace the epochs of different styles of art, and are of great assistance in our philological researches. [See MEDALS.]

NUM'MULITE (*nummus*, money: *Lat.*; and *lithos*, a stone: *Gr.*), the fossil remains of a small chambered shell, round and flat, like a coin. It was inhabited by an animal of very low organization, belonging to the group of *Foraminifera* [which see]. There is a calcareous formation of the eocene epoch, occurring in every quarter of the globe, and having occasionally a width of 1800 miles, with a thickness of some thousands of feet, which abounds to a surprising extent with several species of nummulites. This formation is found in the Alps, Pyrenees, Carpathians, and Himalayas. In the last-mentioned mountains nummulites have been seen at a height of 16,500 feet. The great pyramids of Egypt were built of nummulitic limestone.

NUN'CIO (*Ital.*; from *nuntio*, I inform: *Lat.*), an envoy sent by the pope on foreign missions which concern ecclesiastical affairs.

NUN'CUPATIVE WILL (*nuncupo*, I name: *Lat.*), in Law, a will or testamentary desire expressed verbally, but not put into writing. It depends merely on oral testimony for proof, though afterwards reduced to writing. Nuncupative wills are not now valid, unless they regard the personal estate of soldiers and seamen, or were executed before January 1st, 1838. *Nuncupative*, in a general sense, signifies that exists only verbally.

NUN'DINÆ (*nonus*, the ninth; and *dies*, a day: *Lat.*), in Antiquity, days set apart by the Romans for the country people to expose their wares and commodities for sale, very similar to our market or fair days. They were called *nundinæ*, because they were kept every ninth day.

NUN'NERY (*nonne*, a nun: *Ger.*), in the Roman Catholic Church, a religious house for *nuns*, or females who have bound themselves by vow to a single life.

NUR'SERY (*nourrice*, a nurse: *Fr.*; from *nutrix*: *Lat.*), in Gardening, a piece of land set apart for raising and propagating all sorts of trees and plants, to supply the garden or plantations.

NUT, in Botany, a one-celled fruit in which the pericarp becomes hard, and bracts surround the base. The immature ovary contains several ovules, but there is only one when the fruit is mature. The fruit of the hazel is a nut. The bracts are united into a cup in the acorn. The term *glans* is frequently applied to the nuts borne by the oak, beech, and chestnut trees.

NUTA'TION (*nutatio*, a nodding: *Lat.*), in Astronomy, the gyratory movement of the earth's axis, which, but for the precession of the equinoxes, would cause the pole of the equator to describe a small ellipse among the stars in about 19 years. The action of the sun and moon on the protuberant mass about the earth's equator tends to draw the plane of the latter towards that of the ecliptic—that is, to diminish the angle between them. The earth's rapid rotation on its axis prevents the inclination of the two planes from being permanently altered, but communicates a motion to the plane of the equator of such a nature that its pole describes a circle about the pole of the ecliptic, though with a velocity amounting to only 50'1" annually. It would therefore take 25,868' years to describe the whole circle. A similar action of the moon causes the pole of the earth's equator to revolve in nearly 19 years, in a small circle, about the pole of the moon's orbit, which does not coincide with the pole of the ecliptic, being always 5° 9' from it. The earth's pole, therefore, has a double motion—a slow one round the pole of the ecliptic, and a more rapid one round the pole of the moon's orbit, which itself moves round the pole of the ecliptic on account of the motion of its own line of nodes, in about 19 years. The path, therefore, described by the pole of the equator round the pole of the ecliptic is not simply an elliptic curve, but a gently undulated ring, and these undulations constitute each of them a nutation of the earth's axis. As the sun, at different positions of the earth in her orbit, on account of her different distances from it, has a different effect in altering the obliquity of the ecliptic, there is a semi-annual variation, depending on the sun alone, which is called the *solar nutation*; the combined action of the sun and moon is termed the *luni-solar nutation*.

NUT'GALLS, excrescences on the leaf of the oak. The Aleppo galls are imported for the use of dyers, calico-printers, &c. [See CYNIPS.]

NUT'HATCH, the *Sitta Europœa* of ornithologists, a climbing bird, inhabiting woods in England and on the continent of Europe. It runs along the trunk of a tree upwards and downwards with the same ease, and so smoothly that its motion is said more to resemble that of a mouse than that of a bird. Its popular name is derived from its habit of opening nuts to get at the kernel, by means of repeated blows of its bill, the nuts being first placed in a crevice in a tree.

NUT'MEG, the nut of the *Myristica moschata*, a tree growing in the Indian archipelago. The fruit is of the kind called a *drupe*, that is, a pulpy pericarp without valves, containing a nut, which is enveloped by a substance called mace. The nutmeg tree yields three crops annually. Several other species of the genus yield aromatic fruit of an inferior kind.

NUTRI'TION (*nutrio*, I nourish: *Lat.*), in the animal economy, is the assimilation of nutritive matter to our organs, or the repairing of the continual loss which the different parts of the body undergo. The motion of the parts of the body, the friction of those parts with each other, and especially the action of the air, would soon entirely destroy the body if the loss were not repaired by a proper diet, which being digested in the stomach, and afterwards converted into chyle, mix with the blood, and are distributed through the whole body for its nutrition. When the nutritive matter has been animalized, or assimilated to the body which it is designed to nourish, by the organs of digestion, absorption, circulation, respiration, and secretion, the parts which it supplies retain and incorporate it with their own substance. This nutritive identification is variously effected in the brain, muscles, bones, &c.; each of these appropriates to itself, by a true secretion, that which is found analogous to its nature, and rejects the heterogeneous particles. Thus, a bone is a secretory organ that attracts to itself phosphate of lime. It is the same in muscles with respect to fibrin, and in the brain with albumen; each part imbibes, and forms into a portion of its own structure, such juices as are of the same nature, in consequence of a power, of which the affinity of aggregation of the chemists gives us an idea, or perhaps furnishes us with a model. Every living body, without exception, seems to possess a faculty of decomposing the substances by means of which it is supported, and of giving rise to new products. The animal machine is therefore continually destroyed, and at one period of life does not, perhaps, contain any of those particles of which it was constituted at another.

NUX VOM'ICA (emetic nut: *Lat.*), the seeds of an East Indian tree, the *Strychnos nux vomica*, nat. ord. *Loganiaceæ*. They yield STRYCHNINE, which see.

NYCTALO'PIA (*nuktalopia: Gr.*), a malady of the eyes, commonly called night-blindness, under which the patient, though able to see by day, is unable to distinguish objects by artificial light, or in the twilight. It is supposed to proceed from a partial paralysis of the retina.

NYL'GHAU (*nyl gau*, a blue bull: *Hind.*), the *Portax tragocamelus* of zoologists, an Indian animal belonging to the antelope section of the bovine family. Its body, horns, and tail are not unlike those of a bull; and the head, neck, and legs are very similar to those of a deer. Its colour, in general, is ash or grey. Its horns are about seven inches long, and of a triangular shape. The female is much smaller than the male, more resembles the deer, and has no horns. It is the largest and finest of the antelope species. Its temper is vicious, and being both powerful and resolute it is not often made an object of chase.

NYMPH'A, or NYMPH (*numpha*, a nymph: *Gr.*), in Entomology, the second state of an insect passing to its perfect form —another name for the *pupa*, *chrysalis*, or *aurelia*.

NYMPHÆ'A (*Gr.*), in Botany, a genus of plants, nat. ord. *Nymphæaceæ*, including our white water lily. The *Victoria regia* belongs to the same order.

NYMPHS (*numphai: Gr.*), in Heathen Mythology, local goddesses; they were termed *Nereids* when belonging to the sea, *Naiads* when attached to fountains, *Dryads* when found in the woods, &c.

NYSTAG'MUS (*nustagmos*, from *nustazo*, I am sleepy: *Gr.*), in Medicine, a twinkling of the eyes, such as happens when a person is very sleepy.

O

O, the fourth vowel and the fifteenth letter in the alphabet, is pronounced by projecting the lips, and forming an opening resembling the letter itself. The English language represents no fewer than four sounds by the character *o*, exemplified in the words, *no*, *prove*, *for*, *not*. The French indicate the sound *o* (pronounced as in *no*) by various signs. The use of *o* is next in frequency to that of *a*. It is used particularly to express admiration, warning, pity, imploring; and, in general, as introductory to language expressive of great emotion, as *O!* or *oh!* With an apostrophe after it, *O* is a prefix in some Irish proper names, and seems to have had originally the force of the French *de*, the prefix *Mac* corresponding to *Fitz* in England. It stands for *Old*, as O. S. (*Old Style*), &c., but is not often used as an abbreviation.

OAK, a tree ranking among the most useful of temperate climates. More than eighty species are known; but the common European oak (*Quercus robur*) is a tree of the first consequence, on account of the qualities of its wood. It usually attains the height of from 60 to 100 feet, with a trunk from 6 to 12 feet, or more, in circumference; but it sometimes reaches to an enormous size. In 1810 an oak tree, which grew about four miles from Newport in Monmouthshire, and was felled for the use of the roya navy, contained 2416 cubic feet of sound and convertible timber. The main trunk was nine feet and a half in diameter. It was purchased, standing, for 405*l.*, and, when brought to market, realised nearly 600*l.* But the most magnificent oak ever produced in England was probably that dug out of Hatfield bog; it was about 120 feet in length, twelve in diameter at the base, ten in the middle, and six at the smaller end where broken off; the butt for sixty feet squared seven feet of timber, and four its entire length. From the solidity and durability of its wood, the oak is employed for a vast variety of purposes, and above all for ship-building. For supporting a weight, resisting a strain, and not splintering with a cannon-shot, it is superior to every other timber. Before the introduction of mahogany, it was very generally used for furniture. The oak timber imported from the continent and from America is very inferior to what is grown in this country. There are two varieties of British oak which are frequently considered distinct species, one having stalked fruit, the other unstalked fruit, and hence named *Quercus pedunculata* and *Quercus sessiliflora*. There was a common opinion that the latter affords a less valuable timber than the former, but this is now believed to be a mistaken notion, arising from omitting to notice the locality where the sessile flowered oak grew, for the timber of this tree is much affected by the soil in which it grows. The growth of the common oak, in general, is extremely slow, but it should be cut when it is between 50 and 70 years old. The flowers are monœcious, that is the stamens are in one flower, forming a sort of catkin, and the pistil in another. The *acorn* is the fruit of this tree, and, though now used only as the food of swine, in ancient times it formed an important article of nutriment to some of the northern nations, and, among others, to the rude inhabitants of the British isles. The oak is raised from the acorn, sown either where the tree is to stand, or in a nursery whence the young trees are transplanted. ——*Oak-bark* is used in tanning. In medicine, it is a strong astringent, and is therefore applied in hæmorrhages. Both the bark and the leaves are employed in hot-beds; and the leaves are now reckoned better for this purpose than the bark.

OAK'-GALLS, protuberances on the leaves of the oak, formed and inhabited by insects. They appear in April, and remain till June or longer. When opened, they are found to contain one insect only. It might appear that the parent fly, when she forms a gall for the habitation of her offspring, places it in an impregnable fortress. This is not the case; for it frequently happens that a fly which produces a worm of the carnivorous kind, pierces the gall and deposits her egg within it. This worm, when hatched, feeds upon the proper inhabitant; and finally, after devouring it, passes itself into the chrysalis state, and then, in the form of its parent fly, makes its way out of the gall.

OAK'UM (*œcumbe*, combings, refuse: *Sax.*), old ropes untwisted, and pulled out into loose hemp; used in caulking the seams, tree-nails, and bends of a ship, to stop or prevent leaks. That formed from untarred ropes is called white oakum.

OAR, a long piece of timber, flat at one end and round at the other, used to propel a boat or barge on the water. The flat part is called the *blade;* and the round end the *loom*, which terminates in the *handle*. The fulcrum is the hole in the gunwale called the *rowlock*, or the space between the pins called *thole-pins*. To *boat the oars* is to lay them in after rowing. To *feather the oar* is to hold the blade horizontally, so as not to catch wind. *To lie on the oars* is to suspend rowing for a short time; this is done also as a salute to persons of distinction when passing. To *ship the oars* is to fix them in the rowlocks; and to *unship the oars* is to throw them out of the rowlocks.

O'ASIS (*ouah: Copt.; wah: Arab.*), a fertile spot, situated in the midst of the uninhabitable deserts of northern Africa; the name is also applied to a cluster of verdant spots. In the desert of Sahara there are several oases, which serve as halting-places for the caravans. They are described as spots of exceeding beauty, but something is due to the striking contrast with the deserts around them: their fertility arises from springs of water. The Romans used them occasionally as places of banishment, on account of their being, though agreeable, as it were out of the world, and its being very difficult to escape from them. Some noble remains are found in the larger oases: thus the temple of Jupiter Ammon, at Siwah.

OAT, the *Avena sativa*, a plant of the nat. ord. *Graminaceæ*. When the seed or grain only is meant, the word is commonly used in the plural, *oats*. *Oatmeal* forms a considerable article of food for man in some countries; and oats are everywhere excellent food for horses and cattle. The oat is the hardiest of all the cereal grasses, growing luxuriantly in cold northern climates, and in mountainous districts, where neither wheat nor barley can be advantageously cultivated. In Scotland, it has long formed a principal part of the food of the people; and great quantities are sown in Ireland. Bruce has described a wild species which he met with at Aroossi, a small territory on the Nile. 'Wild oats,' says this traveller, 'grow up here, spontaneously, to a prodigious height and size, capable often of concealing both the horse and his rider, and some of the stalks being little less than an inch in circumference. They have, when ripe, the appearance of small canes.' Several kinds of oats are cultivated: the *potato oat* has long enjoyed the highest reputation in this country. The produce of oats varies greatly: not more than 20 bushels an acre are obtained from inferior ground; while 60, 70, and even 80, have been produced from good ground.

OATH (*ath: Sax.*), a solemn affirmation made in the presence of a magistrate or other person rendered competent by the law to administer it, in which the person sworn calls upon the Almighty to witness that his testimony is true: invoking his vengeance, and renouncing his favour, if what is said be false, or what is promised be not performed. A witness swearing falsely is subject to the penalties of perjury. By statute, all who hold offices of any kind under the government, members of the house of commons, ecclesiastical persons, members of colleges, schoolmasters, serjeants-at-law, barristers, &c., are required to take the oaths of allegiance, &c. The Quakers and Moravians—influenced by the sense which they attach to that text of Scripture in St. Matthew (v. 34) which says, 'Swear not at all,' and St. James's words (v. 12)—refuse to swear upon any occasion, even at the requisition of a magistrate, and in a court of justice, and they have been relieved from being compelled to do so by the legislature. Persons who cannot take an oath are declared by the existing law to be incapable of being witnesses; such are those who will not declare their belief in God, and in a future state of rewards and punishments, or who do not believe that perjury will be punished by the Deity; also those who are incapable of comprehending the nature of an oath. Declarations have been substituted for oaths, in a great number of cases; especially those relating to the customs, excise, and post-office. Oaths to perform illegal acts do not bind; nor do they excuse the performance of such acts. The Jews are sworn with their hats on.

OBADI'AH, or PROPHECY OF OBADIAH, a canonical book of the Old Testament, which is contained in one single chapter, and is partly an invective against the cruelty of the Edomites, and partly a prediction of the deliverance of Israel, and of the victory and triumph of the whole church over her enemies.

OBCOR'DATE (*ob*, down; and *cor*, a heart: *Lat.*), in Botany, shaped like a heart, with the apex downwards.

O'BEAH, a species of witchcraft practised among the negroes, the apprehension of which operating upon their superstitious fears, is frequently attended with disease and death.

OB'ELISK (*obeliskos*: a *dim.* of *obelos*, any pointed instrument: *Gr.*), in Architecture, a high quadrangular pillar, diminishing as it ascends, and terminating, not in a flat surface, but in a small pyramid. Obelisks are of Egyptian origin, and, according to Herodotus, were first erected in honour of the sun. It was formerly supposed that one of their uses was to find the meridian altitudes of the sun at different times of the year, serving instead of very large gnomons; but this opinion is now exploded, though it has been stated that Augustus erected one at Rome, in the Campus Martius, which marked the hours on a horizontal dial drawn on the pavement. Diodorus mentions two obelisks of Sesostris, placed before a Theban temple, which were 120 cubits high; and Herodotus, two others, 100 cubits high, one of which was erected before a temple at Sais, and the other before the temple of the sun at Heliopolis. In the plenitude of their power the Romans removed many of these relics, of times then ancient, from their original situations into Italy, and re-erected them there. One of these obelisks, now standing at Rome—that of St. John of Lateran—is 105 feet in height without the pedestal, and weighs 440 tons. The obelisk next in size was, on being brought from Egypt, placed in the Vatican circus by Caligula; but it now stands in the piazza of St. Peter's, and, including the pedestal, is 132 feet in height. The obelisk of Luxor, now at Paris, is 76 feet high. Cleopatra's Needle, an obelisk given to the British nation, but still lying in Egypt, is 63 feet long. The ancient Egyptians must have had an extraordinary knowledge of mechanics, to have been able to bring these and similar masses from the quarries, and elevate them to their respective positions; even in modern times, to do this is considered a wonderful feat of engineering.——In Printing, an *obelisk* (†) is used as a reference to a note in the margin or at the foot of the page.

OBE'SITY (*obesus*, fat: *Lat.*), a tendency to the formation of fat, which often amounts to a disease. There have been some very remarkable examples of obesity. The celebrated Daniel Lambert, who died at 40 years of age, weighed, a little before his death, 739 lbs. And there is, in the 'Philosophical Transactions,' an account of a girl, only 4 years old, who weighed 256 lbs.

O'BIT (*obitus*, death: *Lat.*), in the Roman Catholic church, a funeral solemnity, or office for the dead. In religious houses there is a register, in which are entered the *obits* of their founders and benefactors, which is thence termed the *obituary*.

OB'ITER DICTUM (spoken by the way: *Lat.*), amongst lawyers, an opinion of a judge not material to the point at issue.

OB'JECT-GLASS, in Optics, the glass of a telescope or microscope next the object. Its purpose is to form a picture which may be magnified by the eye-glass.

OBJECT'IVE CASE (*objectus*, an object: *Lat.*), in English and other grammars, a term used for the *accusative* case. The objective case is that of the noun to which the action refers. Thus, in 'I reminded the master,' *master* is in the accusative or objective case.—OBJECTIVE LINE, in Perspective, the line of an object, drawn on the geometrical plane, the representation of which is sought for in the draft or picture.——OBJECTIVE PLANE, any plane situated in the horizontal plane, the perspective representation of which is required.

OB'LATE (*oblatus*, offered: *Lat.*), in Ecclesiastical Antiquities, a person who, entering the monastic state, gave all his goods to the community. Also, one dedicated from early life by his parents to a religious order; or, a layman residing in a religious community, to which he had assigned his property, either for ever, or during his residence. Such persons were lay-brothers, and the form of their admission was putting the bell-ropes of the church round their necks, as a kind of dedication to its service. They wore a religious habit different from that of the monks. A layman who had made over to a community not only his property, but his person as a bondsman, was termed an *oblate*. Also, in France, an invalided soldier, recommended to a monastery for maintenance by the king, who had the privilege of naming several for that purpose.——OBLATE (*oblatus*, flattened: *Lat.*), in Geometry, an epithet for any figure that is flattened or shortened; as an *oblate spheroid*, such as our globe, which has its axis shorter than its middle diameter.

OBLA'TION (*oblatio*, an offering: *Lat.*), a sacrifice or offering made to God. In the canon law, oblations are defined to be anything offered by godly Christians to God and the church, whether moveables or immoveables. Till the 4th century, the church had no fixed revenues, the clergy wholly subsisting on voluntary oblations.

OBLIGA'TION (*obligatio*, a being bound: *Lat.*). In a Legal sense, *obligation* signifies a bond.

OBLIGA'TO (bound: *Ital.*), in Music, a term used with regard to those voices or instruments which are indispensable to the just performance of a piece.

OBLI'QUE (*obliquus*, slanting: *Lat.*), deviating from a perpendicular line or direction: as an oblique angle, &c., that which is not a right one.——OBLIQUE PLANES, in Dialling, are those which decline from the zenith, or incline towards the horizon.——OBLIQUE ASCENSION and DESCENSION, in Astronomy, those points of the equinoctial which rise and set with the sun, or any other point of the heavens in an oblique sphere.——OBLIQUE SAILING, is when a ship sails upon some rhomb between the four cardinal points, making an oblique angle with the meridian.

OBLIQ'UITY (*obliquitas: Lat.*), deviation from a right line; a direction which is neither parallel nor perpendicular: generally applied to the ecliptic, which deviates from the plane of the earth's equator, 23° 27′ 36·52″.

O'BOE. [See HAUTBOY.]

OB'OLUS (*obolos: Gr.*), a small Grecian silver coin, worth rather more than three-halfpence. It was this coin which was placed in the mouth of the dead, to pay Charon for their passage over the Styx.——OBOLUS, as a weight, the sixth part of a *drachma*.

OBO'VATE (*ob*, down; and *ovatus*, shaped like an egg: *Gr.*), in Botany, *obversely ovate*, or ovate inverted, a term for a leaf the narrow end of which is downwards.

OBSECRA'TIO (*Lat.*), in Roman Antiquity, a solemn ceremony performed by the chief magistrates of Rome, to avert any impending calamity. It consisted of prayers offered up to those gods whom they supposed to be enraged. So exact were they in observing the prescribed form on these occasions, that a person was appointed to read it over to him who was to pronounce it; and the most trifling omission was held sufficient to vitiate the whole solemnity.

OBSECRA'TION (last), in Rhetoric, a figure in which the orator implores the assistance of God or man.

OBSERV'ATORY (*observatio*, a watching: *Lat.*), a building fitted up with astronomical, magnetical, or meteorological instruments, for the purpose of making observations. We find astronomical observatories mentioned at a very early period; some of them existed in Chaldæa, ancient Persia, India, and China. The most celebrated modern ones are those at Greenwich, Paris, Berlin, St. Petersburg, Munich, Palermo, and Cambridge, U.S.; and the accuracy of their instruments is such, that the astronomers who use them are enabled to calculate to the 3600th part of a minute of time, and the 216,000th part of a degree. The first regular observatory erected in Europe was that of Tycho Brahe, in 1576. The Greenwich observatory was built in 1675, by order of Charles II. at the instance of Sir Jonas Moore and Sir Christopher Wren; the former being surveyor-general of the ordinance. The duty of making observations was first committed to John Flamsteed, a man who, as Halley expresses it, seemed born for the employment. In the year 1690, having provided himself with a mural arch, of seven feet diameter, well fixed in the plane of the meridian, he began to verify his catalogue of fixed stars, which hitherto had depended altogether on the distances measured with the sextant, after a new and very different manner, viz. by taking the meridional altitudes, and the moments of culmination, or, in other words, the right ascension and declination. In the space of upwards of forty years this astronomer collected an immense number of observations, which may be consulted in his 'Historia Cœlestis Britannica,' published in 1725; the principal part of which is the British catalogue of fixed stars. This observatory is situated on the highest eminence of Greenwich park, about 160 feet above low-water mark. The observations made here not only possess unrivalled accuracy, but have been the foundation of the most important work on practical astronomy ever published, viz. the Nautical Almanack, which Maskelyne commenced in 1767. There are many other observatories in the United Kingdom, both public and private. The instruments essentially necessary for an observatory are a *transit instrument*, and *sidereal clocks*, for observing right ascensions; a *circle*, for observing polar distances; a *barometer* and *thermometer*, for observing the state of the atmosphere, that the corrections for refraction may be made with accuracy. For the purpose of observing the moon still nearer to her conjunctions with the sun, an *altitude and azimuth instrument*, of extraordinary steadiness, was erected in the observatory at Greenwich, in 1847.—The places where meteorological and magnetic observations are carried on are also styled observatories. The Observatory of Kew, established and still supported by the British Association, is devoted to both these purposes.

OBSID'IAN, in Mineralogy, a glassy lava, of various colours, but usually black, and nearly opaque. It consists of silica and alumina, with a little potash and oxide of iron. Pliny says it received its name from Obsidius, who first found it in Ethiopia.

OBSID'IONAL COINS (from *obsideo*, I besiege: *Lat.*), in Numismatics, coins of various base metals, and of different shapes, struck in besieged places, as a substitute for current money. The oldest known are those struck at the siege of Pavia, under Francis I.

OBSIDIONA'LIS CORO'NA (a siege crown, from same *deriv.*), a crown or garland made of grass or herbs found on the spot, and given by the Romans to such generals as had delivered a Roman army or fortress besieged by the enemy.

OB'TURATORS (*obturo*, I stop up: *Lat.*), in Anatomy, muscles which fill up openings in the bones.

OCCIDEN'TAL (*occidentalis*, westerly; *Lat.*), *western*, in the direction of where the sun sets; opposite to *oriental*, or *eastern*, the direction in which the sun rises.——OCCIDENTAL, in German Sculpture, a term applied to those precious stones which are of an inferior kind.

OC'CIPUT (*Lat.*), in Anatomy, the hinder part of the head.——*Occipitis os*, called also *os memoriæ*, and *os nervorum*, that bone which forms the posterior and inferior part of the skull. It is of an irregular figure, convex on the outside, and concave internally; and is thicker and stronger than any other of the bones of the head, except the petrous parts of the *ossa temporum*.

OCCULTA'TION (*occultatio*, a hiding: *Lat.*), in Astronomy, the obscuration of any star or planet by the interposition of any other body, as the moon, &c. Like a solar eclipse, an occultation is confined to only a portion of the terrestrial globe, for the moon is not between the star and all parts of the earth. As the motion of the moon in her orbit is from west to east, the first contact or *immersion* must occur on her eastern limb; and the *emersion*, or reappearance, on her western. By analogy, a total eclipse of the sun is an occultation of that luminary.

OCCULT' SCI'ENCES (*occultus*, concealed: *Lat.*), a term applied to the imaginary sciences of former times—alchemy, astrology, but, above all, magic.

O'CEAN (*ōkeanos: Gr.*), the name given to that great mass of salt water which surrounds the land, covering nearly three-quarters of the globe. There is a good deal of disparity between the extent of the ocean in the two hemispheres, there being an excess of land in the northern hemisphere over that of the southern in the ratio of 11 to 4. It is remarkable that the line of the equator lies upon sea for five-sixths of its length. The ocean, though really continuous, is, for convenience of description, divided by geographers into five portions:—1. The Pacific ocean, which separates Asia from America, and is the largest of all—being of greater extent than the whole of the dry land; 2. the Atlantic ocean, having Europe and Africa on its eastern shore, and America on its western; 3. the Indian ocean, which washes the south of Asia and the south-eastern coast of Africa; 4. the Arctic ocean, which surrounds the north pole; and 5. the Antarctic ocean, which surrounds the south pole. Other smaller parts of this great connected body of water are termed *seas*. The bed of the ocean presents the same irregularities of aspect as the surface of the land. It is diversified by rocks, mountains, plains, and deep valleys. The greatest depth that has ever been sounded is 25,000 feet, and this was in the North Atlantic immediately to the southward of the Great Bank of Newfoundland. Laplace calculated the *mean* depth of the great oceans to be at least 21,000 feet. The level of the ocean, independently of the changes produced by the tides, is not everywhere the same—that is, it does not form a part of the same spheroid; but the difference is not so great, in some cases, as has been supposed. Gulfs and inland seas are affected according to their position with regard to prevailing winds. The level of the Red sea was found to be 32½ feet higher than that of the Mediterranean, which is supposed to be lower than the ocean. The waters of the gulf of Mexico are believed to be about two feet higher than those of the Pacific ocean. The Baltic and Black seas are lower in summer than in winter, on account of the smaller supply from the rivers and the greater evaporation. The temperature of the ocean (water being a bad conductor of heat) is much more uniform than that of the land; at a certain depth it probably remains always the same. Its usual tint is a bluish green, but in certain localities its colour varies from peculiar circumstances, the difference being considered due to animalcules, to marine vegetables, to the colour of the soil, and very often to that of the sky. The ocean holds in solution a number of saline matters, the most abundant being common salt, which constitutes very generally two-thirds of the whole. The saltness of the ocean is very uniform, but it diminishes near large masses of ice; and the southern ocean contains rather more salt than the northern. The mean spec. grav. of sea water near the equator is 1·02777. [See TIDES, SEA, &c.]

OCHLOC'RACY (*ochlos*, a mob; and *krateo*, I govern: *Gr.*), a form of government in which the multitude or common people rule.

O'CHRE (*ochra: Gr.*), a genus of earths slightly coherent, composed of fine, smooth, soft, argillaceous particles. It is of various colours, always due to oxide of iron, which is sometimes so considerable in quantity that the ochre may be reckoned an ore of that metal: thus in certain kinds of the native *red ochre*, called in England *reddle* and *red chalk*.

O'CHRO, the seeds of the *Abelmoschus esculentus*, a malvaceous plant cultivated in warm climates. They are mucilaginous and form an ingredient in soups.

OC'TAGON (*oktō*, eight; and *gōnia*, an angle: *Gr.*), in Geometry, a figure of eight sides and eight angles. When all the sides and angles are equal, it is called a *regular octagon*.——In Fortification, a place with eight bastions.

OCTAN'DRIA (*oktō*, eight; and *anēr*, a male: *Gr.*), the eighth class of the Linnæan system of plants, comprehending those which have hermaphrodite flowers, with eight stamens.

OC'TANT (*octans*, an eighth part or half quadrant: *Lat.*), an instrument for measuring angles; which, from the manner in which the rays are reflected, are double those indicated by the arc; and hence it answers the purpose of a *quadrant*.——OCTANT, in Astronomy, an aspect of two planets when they are distant from each other 45 degrees, or the eighth part of a circle.

OC'TAVE (*octavus*, the eighth: *Lat.*), in Music, the eighth interval in a scale, which, as it affords a sound agreeing very closely with the first, is denoted by the same letter of the alphabet. The most simple perception that we can have of two sounds is that of unisons; the vibrations beginning and ending together. The next to this is the octave, where the more acute sound makes precisely two vibrations, while the deeper makes one; consequently, the vibrations of the two meet at every vibration of the more grave. Hence unison and octaves pass almost for the same concord; hence also the proportions of the two sounds that form the octave are, in numbers or in lines, as 1 : 2, so that two cords or strings of the same material, thickness, and tension, one of which is double the length of the other produce the octaves. The number of upper and lower octaves, or the manner in which the several octaves of the scale are to be chiefly distinguished, is not absolutely determined, on account of the continually increasing compass of instruments.——**OCTAVE**, in the Roman Catholic church, a festival day and the seven days immediately following it; the last or eighth day being termed *the octave*, or *octave day*. The circumcision is the octave of Christmas-day. A festival is supposed, in that church, to last during its octave, and therefore the office and mass on every day during the octave are invariably those of the festival, unless a greater feast interferes, by occurring within the octave. In the Roman Catholic church, all great holidays have octaves.

OCTA'VO (same *deriv.*), in Printing, the form of a page which is made by folding a sheet into eight leaves, or sixteen pages. It is often written 8vo.

OCTO'BER (*Lat.*, from *octo*, eight), the tenth month of the Julian year, consisting of thirty-one days; it obtained the name of October from its being the eighth month in the calendar of Romulus.

OCTOHE'DRON (*oktō*, eight; and *hedra*, a base: *Gr.*), in Geometry, one of the five regular or Platonic bodies; consisting of eight equal and equilateral triangles.

OCTOPET'ALOUS (*oktō*, eight; and *petalon*, a leaf: *Gr.*), in Botany, having eight petals or flower leaves.

OC'TOPUS (*oktō*, eight; *pous*, a foot: *Gr.*), a genus of cuttle-fishes, including the poulpe of our coasts and the polypus of ancient writers. When alarmed they vary their colours according to the nature of the ground over which they pass, in order to escape detection, and with the same object they eject a quantity of ink which discolours the water.

OCTOSPERM'OUS (*oktō*, eight; and *sperma*, a seed: *Gr.*), in Botany, containing eight seeds.

OC'TOSTYLE (*oktō*, eight; and *stulos*, a column: *Gr.*), in Ancient Architecture, the face of an edifice decorated with eight columns. These may be disposed either in a right line, as in the Pantheon; or in a circle, as in the temple of Apollo Pythius at Delphi, &c.

OC'TROI (*auctoritas*, authority: *Lat.*), an impost levied at the gates of many towns and cities in France, and applied partly to the general expenses of the state, and partly to local purposes. There were 1500 communes subject to it, forming a revenue of nearly 100,000,000 francs, of which the city of Paris alone, before the late changes, produced more than 30,000,000 francs annually.

OC'ULUS. [See EYE.]

OC'ULUS BE'LI (the eye of Belus: *Lat.*), a species of onyx; a semi-pellucid gem of a greyish-white colour variegated with yellow, and with a black central nucleus. It is of a roundish form, and its variegations represent the pupil and iris of the eye; whence the name.——**OCULUS MUNDI** (the world's eye), otherwise called *hydrophane*, a precious stone of an opaque whitish-brown colour; but becoming transparent by immersion in an aqueous fluid, and resuming its opacity when dry. It is found in Hungary, Silesia, and Iceland.——**OCULUS CATI** (cat's eye), or *Asteria*, a beautiful gem, approaching the nature of the opal, having a bright colour which seems to be lodged deep in the stone, and which shifts as it is moved in various directions. It is larger than a pea, and generally semicircular.

OD'ALISQUE (*odah*, a chamber: *Turk.*), a female slave in a Turkish harem.

ODE (*ōdē*, a song: *Gr.*), a poem belonging to that class of lyrical compositions which express the feelings of the poet with the vividness which present emotion inspires. The ancient odes had originally but one stanza, or strophe; but afterwards they were divided into three parts, the *strophe*, the *antistrophe*, and the *epode*. Unlike those of the moderns, they were usually intended to be sung and accompanied by some musical instrument. The *heroic ode* celebrates heroes or sons of gods, princes, victory, greatness of mind, &c. In course of time love and festivities were likewise thought suitable to the ode. Anacreon and Sappho excelled in this species of composition, and Horace has left us odes of various kinds, written with peculiar elegance. Among the moderns, Dryden's ode on St. Cecilia's day, and Pope's on the same subject, rank high. Coleridge and Wordsworth have also written some striking compositions of this class. Variety of numbers is essential to the ode. At first, indeed, its verse was of but one kind, but, in order to adapt it to music, the poets varied its measure to an almost boundless extent. The Pindaric ode is distinguished by its boldness and the loftiness of its flights; but Pindar, though the most daring and elevated of the lyric poets, amidst all his raptures has preserved harmony, and often uniformity, in his versification. The dithyrambic ode was a Bacchanalian song; and, on account of the attributes of the deity to which it was dedicated, it admitted of great irregularity; hence its name has been applied, in modern times, to all odes of a wild impetuous character.

ODE'ON, or **ODE'UM** (*ōdeion*, from same: *Gr.*), in Greek and Roman Architecture, a public building devoted to poetical and musical contests. The first odeon was built at Athens by Pericles, and was afterwards used for popular meetings and the holding of courts. The odeons resembled other theatres, except that they were not so large, and were covered with a roof.——The name *Odeon* has been given to one of the theatres in Paris, and in Munich to a concert-room.

ODONTAL'GIA (*odontalgia*, from *odous*, a tooth; and *algos*, pain: *Gr.*), in Medicine, the *tooth-ache*.

ODONTI'ASIS (*Gr.*, from *odontiao*, I cut my teeth), in Medicine, *teething*, or cutting the teeth.

ODONTOI'DES (*odous*, a tooth; and *eidos*, form: *Gr.*), in Anatomy, an epithet for the tooth-like process of the second vertebræ of the neck.

ODONTOL'OGY (*odous*, a tooth; *logos*, a discourse: *Gr.*), that branch of science which is concerned with the teeth of animals, their structure, mode of growth, &c.

OD'YSSEY (*Odussela*, from *Odusseus*, Ulysses: *Gr.*), a celebrated Greek epic poem, usually attributed to Homer, and containing the adventures of Ulysses in his return from the siege of Troy, and of his son Telemachus, who went in search of him. The principal adventures of Ulysses were his visit to the land of the Lotus eaters and to the land of the Cyclops, where Polyphemus lived in a cave; his arrival at Circe's island, where the enchantress turned his sailors into swine; his descent to the infernal regions, where he saw the shades of his old comrades; his dangerous voyage along the coast of the Sirens and between Scylla and Charybdis; his shipwreck, he only escaping to the island of Calypso, where he was detained seven years; his shipwreck on the coast of Phæacia, where he was hospitably entertained by King Alcinous, who possessed a beautiful garden, the description of which has been often referred to; his arrival at his own kingdom of Ithaca and his return home, when he found his wife Penelope besieged by suitors who had taken possession of his palace. He disguises himself as a beggar, the better to circumvent his enemies. Penelope at length promises to marry any one who can send an arrow from the bow of Ulysses through certain rings. The suitors all try, but fail; the beggar alone succeeds. Telemachus aids his father in slaying his enemies, and Penelope recognises him as her husband. Gods and goddesses are introduced assisting or opposing the hero and his son. The poem is written in hexameter verse and is divided into twenty-four books. It is thought to have been composed by one person, and to be of a later date than the Iliad, the author or authors of which had no hand in it. Grote thinks that both may be assigned to the period between 850 B.C. and 776 B.C.

ŒCUME'NICAL (*oikoumenikos*, from *oikoumenē gē*, the whole habitable earth: *Gr.* —*gē*, the earth, being usually omitted), *general*, or *universal;* as œcumenical council, bishop, &c.

ŒDE'MA (*oidēma*, from *oideo*, I swell: *Gr.*), in Medicine, a puffiness or swelling, arising from water having collected in the cellular membranes; it is attended with paleness and cold, retains the print of the finger when pressed with it, and is accompanied by little or no pain.

ŒNOTHE'RA (*oinothēras:* from *oinos*, wine; and *thēra*, a catching: *Gr.*—from its root, on being dried, acquiring the odour of wine), in Botany, a genus of plants, nat. ord. *Onagraceæ*, including the different species of evening primrose.

ŒSOPH'AGUS (*oisophagos: Gr.*), in Anatomy, the *Gullet*, a membranous and muscular canal, reaching from the fauces to the stomach, and conveying into it the food taken at the mouth. Its figure is somewhat like a funnel, and its upper part is called the *pharynx*.

ŒS'TRUS (*oistros: Gr.*), in Entomology, a genus of dipterous flies. [See GADFLY.]

OF'FERINGS (*offero*, I offer: *Lat.*), in a scripture sense, denote gifts presented by men at the altar, in order to express their entire dependence on and submission to the Deity. They constituted a principal part of the Israelitish worship. With regard to their meaning and object, these offerings were either *thank-offerings* and *peace-offerings*, which consisted of some animal, and were usually accompanied with offerings of vegetable food; or *trespass* and *sin-offerings*, in which only animals were used. In the last-mentioned cases, the priests were accustomed to sprinkle the parties who made the offerings with the blood of the victims, as a sign of reconciliation with Jehovah; and where the offering was an expression of the penitence and expiation of the whole people, it was usual to burn the victim; but if it concerned only private persons, the priests were allowed to eat the flesh.——OFFERINGS, in a modern sense, are church dues, payable by custom; as the Easter offerings, or the offerings at marriages, &c.

OF'FERTORY (*offertorium*, from same: *Lat.*), in the Romish church, a form of words, in the first part of the mass, by which the priest offers the elements previously to their consecration. In the English communion service, the sentences read by the officiating clergyman, while the people are making their offerings.

OF'FICE (*officium*, a business: *Lat.*), a particular charge or trust, or a dignity accompanied by a public function; as the office of a secretary of state, the office of a sheriff, of a justice of peace, &c. *Offices* are civil, judicial, ministerial, executive, legislative, political, municipal, ecclesiastical, diplomatic, military, &c.

OF'FICER (same *deriv.*), a person commissioned or authorized to fill a public situation or perform any public duty. Officers are civil, military, or ecclesiastical. The great officers of the crown, or of state, are the lord high-steward, the lord high-chancellor, the lord high-treasurer, the lord president of the council, the lord privy seal, the lord-chamberlain, the lord high-constable, and the earl-marshal.——In the army, *General officers* are those whose command is not limited to a single company, troop, or regiment, but extends to a body of forces composed of several regiments; such are the general, lieutenant-general, major-generals, and brigadiers.——*Staff officers*, those who belong to the general staff, as the quartermaster-general, adjutant-general, aides-de-camp, &c.——*Commissioned officers* are those appointed by a commission from the crown, from the general to the cornet or ensign, inclusive. ——*Brevet officers*, those who hold a rank without pay, or take rank according to the commission which they hold from the sovereign, and which is superior to the one for which they actually receive pay. ——*Subaltern officers*, all officers under the rank of captain.——*Non-commissioned officers* are sergeant-majors, quartermaster-sergeants, sergeants, corporals, and drum and fife-majors, who are appointed by the commanding officers of regiments.——In the navy, officers are distinguished into —*Commissioned officers*, who hold their commissions from the lords of the admiralty; *Flag officers*, admirals who hoist flags at the mast-head; *Petty officers*, those who are appointed by the captain; *Warrant officers*, the gunner, boatswain, and carpenter.

OFFI'CIAL (*officialis*, pertaining to office: *Lat.*), an ecclesiastical judge appointed by a bishop, chapter, archdeacon, &c., with charge of the spiritual jurisdiction of the diocese.——Also a deputy who is appointed by an archdeacon as his assistant, and who sits as judge in his court.

OFFIC'INAL (*officina*, a shop: *Lat.*), in Pharmacy, an appellation given to such medicines, whether simple or compound, as are directed by the college of physicians to be constantly kept in the apothecaries' shops.

OFF'ING, in sea language, a distance from the shore sufficient to afford deep water, and to render a pilot unnecessary. A ship in the offing is one not far from land; and when she keeps at a distance from the shore she is said to 'keep her *offing*.'

OFF'SET, in Accounts, a sum *set off* against another sum or account, as an equivalent.——In Architecture, the ledge or surface left uncovered when a wall is continued upwards with a diminished thickness.——In Gardening, the young shoots that spring from the roots of plants; which being carefully separated and planted in a proper soil, serve to propagate the species.——In Surveying, a perpendicular let fall from the stationary lines to a hedge, fence, or the extremity of an enclosure.

O'GEE (*ogive: Fr.*), in Architecture, the *Cyma reversa*, which see.

OGI'VE, in Architecture, an arch or branch of a Gothic vault; which, instead of being circular, passes diagonally from one angle to another, and forms a cross with another. The middle, where the ogives intersect, is called the *key*. The members or mouldings of the ogives are called nerves, branches, or reins; and the arches which separate the ogives, double arches. ——The pointed arch itself is termed by the French an ogive.

OIL (*öl: Ger.*; from *oleum: Lat.*), an unctuous substance, derived from various sources, both animal and vegetable. The distinctive characters of oil are inflammability, fluidity, and insolubility in water. The fat oils are little soluble in alcohol, but perfectly so in ether. From the peculiar properties of different oils, they are naturally divided into two kinds, the fixed or *fat oils*, and the *volatile* or essential oils: the former require a high temperature to raise them to a state of vapour, and indeed are decomposed before they reach their boiling point; but the latter are volatilized at or below the temperature of boiling water. The fat oils are generally bland to the taste; the volatile hot and pungent. When exposed to the action of the air, the oils by degrees lose their liquidity, thicken, and occasionally solidify. Such as become indurated take the name of *drying* oils; thus, linseed oil, poppy-seed oil, nut oil, &c. Such as do not harden in this way, but become rancid, are called *unctuous* oils; thus, olive oil, almond oil, rape-seed oil, &c. Those which burn best are a compound of carbon and hydrogen, which, changed into gas having a high temperature, by the application of heat, absorbs the oxygen of the air, emitting heat, flame, and light; but most oils contain oxygen also, and a few of the essential oils sulphur.——The fat oils are medicinally prescribed as relaxing, softening, and laxative remedies; they enter into many medical compounds, such as balsams, unguents, plasters, &c.; they are often used as food, being well adapted for that purpose, in cold countries, on account of their combustible elements, which maintain an effective combustion within the body. [See RESPIRATION.] When boiled with potash or soda, they are decomposed into glycerine, and fat acids which unite with the alkali, forming *soap*. Ammonia affords with them a milky emulsion, called *volatile liniment*; metallic oxides, and alkaline earths, insoluble soaps. Most of the fixed oils and fats are mixtures of two or more substances. Essential oils are employed as cordial, stimulant, and antispasmodic remedies. Chlorine, bromine, and strong mineral acids act energetically on the oils.

OIL GAS. [See GAS.]

OLE'FIANT GAS (*oleum*, oil; and *fio*, I make: *Lat.*), in Chemistry, a colourless elastic fluid, a compound of carbon and hydrogen, which has no taste, and scarcely any odour when pure. It extinguishes flame, does not support the respiration of animals, and is set on fire when a lighted candle is presented to it, burning slowly with an intense white light. It is obtained by the action of sulphuric acid on alcohol. When olefiant gas is mingled with chlorine in the proportion of one measure of the former to two of the latter, they form a mixture which takes fire on the approach of flame, and which burns rapidly with formation of hydrochloric acid, and a thick black smoke composed of particles of carbon; but if the gases are allowed to remain at rest after being mixed together, a very different action ensues. The chlorine, instead of decomposing the olefiant gas, enters into direct combination with it, and a yellow liquid (called Dutch liquid), which is like oil, and has an aromatic odour, not unlike that of caraways, is produced; hence the name of the gas.

OLE'IC A'CID (*oleum*, oil: *Lat.*; from *elaion*, olive oil: *Gr.*), one of the components of fats possessing a distinctly acid reaction. It has many properties that are common to margaric and stearic acids, also components of the fats.

O'LEINE (*oleum*, oil: *Lat.*), or **ELAINE** (*elaion*, oil: *Gr.*), in Chemistry, the thin oily part of fats. It may be pressed out of hog's lard and other solid fats; and may be separated from oils, by exposing them to cold, and then to pressure.

OLFAC'TORY NERVES (*oleo*, I smell of; and *facio*, I cause: *Lat.*), the pair of nerves which proceed from the brain to the nose, and cause the sense of smell. They are the first pair; and, perforating the ethmoid bone, are distributed over the mucous membrane of the nose.

OLIB'ANUM (*oleum Libani*, the oil of Libanus: *Lat.*), a gum-resin brought from the East Indies, which consists of tears or drops of a transparent yellow colour. When burned it exhales an agreeable odour, and is sometimes called *frankincense*. It was formerly used in medicine. It is produced by a tree called *Boswellia serrata*, nat. ord. *Amyridaceæ*.

OL'IGARCHY (*oligarchia*, from *oligos*, few; and *archo*, I govern: *Gr.*), a form of government, in which the administration of affairs is lodged in the hands of a few irresponsible persons.

OL'IVE (*oliva: Lat.*), in Botany, a genus of trees, nat. ord. *Oleaceæ*. The *Olea Europæa*, or common olive, the species most usually cultivated for its fruit, grows to the height of twenty or thirty feet, having an upright stem with numerous branches; the fruit is a unilocular drupe of a somewhat oval shape, containing an ovato-oblong nut with a kernel of the same form, and is almost the only example of a fruit with an oily pulp. The olive was celebrated in the mythology of the ancients; and olive wreaths were used to crown the brows of victors. It was revered by the Greeks and Romans, and was considered the emblem of peace and humility. The *athletes* anointed their bodies with olive oil when preparing for gymnastic exercises; and it was in common use after the bath. It is consumed in vast quantities, for culinary purposes, in many countries; and, as well as the pickled fruit, is the source of considerable trade. The quantity of olive oil imported into England in 1850 was nearly 21,000 tons. It is inodorous, and the taste is very mild; but if taken in large quantities it is purgative. When obtained by simple expression, without the use of boiling water, it is the best and purest; and that made in some parts of France is now the most highly esteemed. Dr. Clarke mentions an interesting fact, 'that, during a period of little more than two thousand years, Hebrews, Assyrians, Romans, Moslems, and Christians, have been successively in possession of the rocky mountains of Palestine; yet the olive still vindicates its paternal soil, and is found, at this day, upon the same spot which was called by the Hebrew writers *Mount Olivet*, and the *Mount of Olives*, eleven centuries before the Christian era.'

OL'IVINE (same *deriv.*), in Mineralogy, a gem of inferior value, being a sub-species of *prismatic chrysolite*, of a brownish or olive-coloured green, often inclining to a yellow hue, usually found in roundish grains in other stones. It frequently occurs in basaltic rocks, and is sometimes associated with meteoric iron. It contains oxide of iron.

OLIV'INITE (same *deriv.*), an ore of copper of an olive-green colour. It is a hydrated phosphate of copper, occurring, with quartz, in micaceous clay-slate.

OLYM'PIAD (*olumpias: Gr.*), a period of four years, by which the Greeks reckoned their time. This method of computation took its rise from the Olympic games, so famous in Grecian history, which were celebrated at intervals of four years. It is said that they were instituted 1354 years before the Christian era, and were revived by Iphitus, king of Elis, 844 B.C. About 100 years after was introduced the practice of designating the Olympiad by the name of the victor; and Corœbus was the first who received this honour. The Olympiad of Corœbus forms the principal era of Grecian chronology. The games in which he was victor were celebrated about the time of the summer solstice, 776 years before the era of the incarnation, in the 3938th year of the Julian period, and 23 years before the date assigned for the foundation of Rome. Subsequently to the introduction of the Metonic cycle, the Olympic year always began with the eleventh day of that moon which followed the solstice, and is usually regarded as commencing on the 1st of July. As the Olympiads began in the middle of the year, the first six months of a year of our era belong to one Olympiad, and the last six to another. Hence, to reduce the date by Olympiads to our era, multiply the number of the past Olympiad by 4, and add the odd years; subtract the sum from 777 if before Christ, or subtract 776 from the sum if after Christ; the remainder will be the year before or after Christ, if the event happened between July and January; but if it happened in the last six months of the Olympic year, that is, between January and July, the remainder must, in each case, be diminished by one. The method of computing time by Olympiads did not come into use until after the death of Alexander; it ceased at the 364th Olympiad, in the year 440 of the Christian era. History is much indebted to the Olympiads; they have served to fix the date of many important events; and, indeed, the history of Greece, before this method of computing time was observed, is almost entirely fabulous, or filled with anachronisms.

OLYM'PIC GAMES, in Antiquity, solemn games among the Greeks in honour of the Olympian Jupiter, which were celebrated once in every four years. Besides running, leaping, boxing, wrestling, and the quoit, there were horse-racing, chariot-racing, &c. Sometimes there were contests in eloquence, poetry, &c. The victor's prize was a wreath of wild olive. A material of small value was chosen, that the combatants might be stimulated by courage and the love of glory, more than by the sordid hope of gain. In fact, the glory of the conquerors (who were termed *Olympionicæ*) was inestimable and immortal. Their statues were erected at Olympia, in the sacred wood of Jove; they were conducted home in triumph on a car drawn by four horses, were complimented by poets, painters, &c.; and many privileges and immunities were thenceforth conferred on them. Not only all the states of Greece, but foreign nations also, resorted to these games, in great numbers, from the extremities of Egypt, from Libya, Sicily, and other countries. The combatants contended naked. At first they used to tie a scarf round their waist; but this having once thrown down a combatant by entangling his feet, and caused him to lose the victory, it was thenceforth laid aside. The priestesses of Ceres excepted, no females were permitted to be present; and if any woman was found to have passed the river Alpheus during the solemnity, she was to be thrown headlong from a rock.

OM'BRE DE SOLE'IL (the shadow of the sun: *Fr.*), in Heraldry, the sun borne in armoury, in such a way that the eyes, nose, and mouth, which are represented at other times, do not appear; and the colouring is so light that the field is seen through it.

O'MEGA, the name of the Greek long *o*. It is the last letter in the Greek alphabet, as *alpha* is the first; and from the expression in Revelations, 'I am Alpha and Omega, the beginning and the ending, saith the Lord, which is, and which was, and which is to come, the Almighty' (i 8), the characters of alpha and omega became with the Christians symbolical hieroglyphics.

OM'ELET (*omelette: Fr.*), a kind of pancake or fritter, made of eggs and other ingredients; much used in France and other countries.

O'MEN (*Lat.*), a casual indication, which men believe to authorize their conjectures regarding future events. Omens differ from other modes of divination, in being accidental. They constitute a superstition as ancient as the world itself; and there is a sameness regarding them, in distant times and countries, which is very remarkable. They may be divided into three classes — those derived from natural occurrences, relating to inanimate objects, as lightning, earthquakes, phosphoric appearances, &c; those derived from animals, especially birds, as the place of their appearance, their voices, actions, &c.; and those which the individual draws from sudden sensations of his own—sneezing has generally been looked upon as particularly ominous. With both Greeks and Romans the good omens came from the east, but the former stood facing the north and the latter the south; hence among the Greeks the right hand denoted good luck, and the left the contrary; among the Romans this rule was reversed, although their writers, in latter times, often adopted the Greek mode of expression. The practice of making ordinary events ominous of good or bad fortune, wherever it may have arisen, spread itself over the inhabited globe, and still prevails among the vulgar and unenlightened of all nations.

OMEN'TUM (*Lat*), in Anatomy, the *caul* or *epiploon:* a membranaceous covering of the bowels, usually furnished with a large quantity of fat; being placed under the peritoneum, and immediately above the intestines.

OM'NIBUS (for all: *Lat.*), omnibuses are of Parisian origin: having been first used in that city in 1825, and in London in 1829.

OM'NIUM (of all: *Lat*), a term relating to the public funds, and used to express the aggregate value of the stock or securities which the subscribers to a loan receive from government. As the omnium of every loan is the subject of extensive speculations, it is generally liable to considerable variations with respect to its current price, sometimes selling at a high premium, at other times at a discount.

OM'PHACITE (*omphakites*, unripe; *Gr.*—from its greenish colour), a mineral of a pale leek-green colour, massive or disseminated, and in narrow radiated concretions.

OMPHALOCE'LE (*omphalos*, the navel; and *kēlē*, a hernia: *Gr.*), in Surgery, an umbilical hernia, or rupture of the navel.

OMPHALOT'OMY (*omphalotomia:* from *omphalos*, the navel; and *temno*, I cut: *Gr.*), in Surgery, the operation of dividing the navel string

ONEIROCRIT'ICA (*Gr*: from *oneiros*, a dream; and *kritikos*, fit for judging), the art of interpreting dreams, and foretelling events from them.

ONGLE'E (*ongle*, a claw: *Fr.*), in Heraldry, an appellation given to the talons or claws of beasts or birds, when borne of a different tincture from that of the body of the animal.

ON'ION (*ognon: Fr.*), the common species is the *allium cepa* of botanists, nat. ord. *Liliaceæ*. Upwards of sixty species of this genus are known, all with bulbous roots. The leek, garlic, and shallot belong to it.

ONOMATOPŒ'IA (*onomatopoiia*, from *onoma*, a name; and *poieo*, I make: *Gr*), in Rhetoric, a figure in which words are formed so as to resemble the sounds made by the things signified; as the *buzz* of bees, the *cackling* of hens, &c.

ONTOL'OGY (*ōn*, a being; and *logos*, a discourse · *Gr.*), the doctrine of being; a name formerly given to that branch of metaphysics which treats of the essential qualities of things

O'NUS PROBAN'DI (*Lat.*), in Law, the obligation of proving what has been alleged.

O'NYX (*onux: Gr*), in Mineralogy, a species of agate, stratified with opaque and translucent lines; being a semi-pellucid gem of different colours The bluish-white kind is looked upon as the true onyx of the ancients. It is valued in proportion as the colours are distinct and opposed. Any stone exhibiting layers of two or more colours, strongly contrasted, is called an *onyx*.——ONYX, in Medicine, an abscess, or collection of pus, between the lamellæ of the cornea; so called from its resemblance to the *onyx* stone. The diagnostic signs of it are, a white spot or speck, prominent, soft, and fluctuating.

O'OLITE (*ōon*, an egg; and *lithos*, a stone: *Gr.*), in Mineralogy, a species of limestone composed of small rounded grains like the roe of a fish. Each grain has commonly a particle of sand for a nucleus about which the calcareous matter is arranged concentrically.——The *oolitic series*, in Geology, includes the great series of secondary deposits lying between the Lower Cretaceous or Neocomian beds and the Lias. In these strata are found the best materials for building which the midland and eastern counties of England produce, and the formations are systematically divided into —1. *the upper oolite*, consisting of the Purbeck beds of Dorset and Wilts, the Portland beds and the Kimmeridge clay of Dorsetshire; 2. the *middle oolite*, which includes the Coral rag and the Oxford clay; and 3. the *lower oolite*, which includes the Great or Bath oolite and the Inferior oolite. The oolitic rocks extend across England from the Yorkshire coast to the Dorsetshire coast, having an average width of nearly 30 miles. On the continent of Europe the oolitic series is well developed, and the whole mountain chain of the Jura is composed of oolitic beds, whence the term Jurassic applied to that series.

OPAC'ITY (*opacitas*, from *opacus*, dark: *Lat.*), the quality which renders anything impervious to the rays of light. It may exist in bodies of any colour.

O'PAL (*opalus*: *Lat.*), in Mineralogy, a precious stone of various colours, which comes under the class of pellucid gems. It consists of silex, with about ten per cent. water. It is found in many parts of Europe, especially in Hungary. It is brittle, and when first dug out of the earth is soft; but it hardens and diminishes in bulk by exposure to the air. The substance in which it is most commonly found is a ferruginous sandstone. It is generally dull, owing to foreign admixture; but in some specimens a lively play of light is observable, while others show different colours by reflected and transmitted light. There are many varieties or species, the chief of which are—1. *noble opal*, which exhibits brilliant and changeable reflections of green, blue, yellow, and red; 2. *fire opal*, which simply affords a red reflection; 3. *common opal*, whose colours are white, green, yellow, and red, but without the play of colours; 4. *semi-opal*, the varieties of which are more opaque than common opal; 5. *wood opal*, which appears in the shape of trunks, branches, and roots of trees; 6. *hydrophane*, which assumes a transparency only on being thrown into water; 7. *hyalite*, which occurs in small reniform and botryoidal shapes, and is transparent; and 8. *menilite*, which occurs in tuberose masses, and is opaque.

OPALES'CENCE (last), a coloured shining lustre, reflected from a single spot in a mineral. It is sometimes simple, and sometimes radiated.

OP'ERA (a work: *Ital.*), a dramatic composition, of which music makes the essential part; and in this it is distinguished from other dramas which are accompanied by music. [See MELODRAMA.] According as the serious or the comic character prevails in the opera, it is termed *opera seria* or *opera buffa*. The name of *grand opera* is given to that kind which is confined to music and song, of which the *recitativo* is a principal feature. An *operetta* is a short musical drama of a light character: to which species of composition the French *vaudeville* belongs. Italy may be considered the birthplace and cradle of the opera; but in Germany romantic operas have also, of late years, been produced with great success.

OP'ERA-GLASS, in Optics, a Galilean telescope, so called from its use in theatres. The field of view of this instrument is very limited, and therefore it cannot be used with a high magnifying power. It is generally *binocular*—that is, consists of a small telescope for each eye. These telescopes are connected together, and have their foci adjustable by turning the same screw.——The name is applied also to an instrument which causes objects to be seen in a direction different from that towards which it is pointed. The rays from the object really looked at enter at the side, are reflected to the eye-glass, and are thence transmitted to the eye. The person who uses it seems to be looking towards a very different point from that to which his attention is really directed.

OPERA'TION (*operatio*: *Lat.*), in Surgery, any methodical action of the hand, performed on the human body, with a view to heal an injured or diseased part, whether instruments are used or not.——Military or naval *operations* signify the movements of an army or fleet to effect some object of warfare.

OPER'CULUM (a lid, from *operio*, I cover: *Lat.*), in Conchology, the plate with which some species of molluscs close the aperture of their shells.——In Botany, the lid which some capsular seed-vessels possess, and which falls off when the seeds are ripe.

OPHICLEI'DE (*ophis*, a serpent: and *kleis*, a key: *Gr.*), a powerful bass wind instrument in a brass band. It is of modern introduction

OPHID'IAN (*ophis*, a serpent; *Gr.*), in Zoology, a term given to reptiles belonging to the order of SERPENTS, which see.

OPHIOL'OGY (*ophis*, a serpent; and *logos*, a discourse: *Gr.*), that part of natural history which treats of serpents.

O'PHITE (*ophitēs*, like a serpent: *Gr.*), in Mineralogy, *serpentine*, or green-speckled porphyry; a dusky green stone of different shades, sprinkled with spots or crystals of a lighter green, so as in some measure to resemble the back of a serpent.

OPHTHAL'MIA (*Gr.*, from *ophthalmos*, the eye), in Medicine, an inflammation of the mucous membrane which covers the globe of the eye, and of the correspondent surface of the eyelids. It may be induced by many different exciting causes, such as sudden transition from heat to cold, residence in damp or sandy countries in the hot season, exposure of the eyes to the vivid rays of the sun, the suppression of some habitual discharge, &c.

OPHTHALMODYN'IA (*ophthalmos*, the eye; and *odunē*, pain: *Gr.*), in Medicine, a violent pain in the eye.

OPHTHAL'MOSCOPE (*ophthalmos*, the eye; and *skopeo*, I examine: *Gr.*), an optical apparatus by which a surgeon can examine the interior of the eye in living persons. It is extremely useful in ascertaining the seat and nature of the disease.

OPIN'ION (*opinio*, from *opinor*, I think: *Lat.*), the judgment which the mind forms of any proposition, of the truth or falsehood of which there is not sufficient evidence to produce absolute certainty.

OPISTHOT'ONOS (*Gr.*: from *opisthen*, backwards; and *tonos*, a straining), in Medicine, a spasmodic action of the muscles of the back, which causes the body to arch backwards. This condition is observed in cases of tetanus. The opposite condition, or *emprosthotonos* (*emprosthen*, forwards:

Gr.), is a tetanic spasm of the anterior muscles of the trunk, by which the body is bent forwards.

O'PIUM (*opos*, juice : *Gr.*), the inspissated juice of a species of poppy, the *Papaver somniferum*, a native of Turkey and other eastern countries, but now naturalized in many parts of Europe. It is obtained by wounding the unripe seed capsules, collecting the milky juice which exudes, drying it in the sun, and kneading it into cakes. Opium is the most energetic of narcotics, and at the same time one of the most valuable of medicines. The opium of commerce is in cakes, covered with pieces of dried leaves, and the seed capsules of some species of *Rumex*. It should be of a rich brown colour, a tough consistency, and smooth uniform texture. Its peculiar narcotic smell ought to be strong and fresh ; its taste is hot, and somewhat acrid Its activity as a medicine depends on the presence of *morphia*, an alkaline base, in combination with *meconic acid*. It contains also *narcotine*, *narceine*, *codein*, gum, resin, extractive matter, and small quantities of other proximate elements. Its great consumption is in China, where, though it is contraband, 27,000 chests of it are used per annum. In 1850, the quantity imported into England was upwards of 126,000 lbs. ; the duty has been, since 1836, only 1*s*. per lb

OPOBAL'SAM (*opobalsamon*, from *opos*, juice, and *balsamon*, balsam : *Gr.*), in Medicine, the *balm of Gilead*, which see.

OPODEL'DOC, in Pharmacy, a saponaceous camphorated liniment : being a solution of soap in alcohol, with the addition of camphor and essential oils. It is considered to be a good remedy for sprains, bruises, &c.

OPOP'ANAX (*Gr.:* from *opos*, juice ; and *panakēs*, all-healing), the concrete juice of an umbelliferous plant, a native of the Levant, the *Opopanax chironum* of botanists. It is usually imported in loose granules or drops, but sometimes in larger masses, of a reddish-yellow colour, and white within. It has a strong smell and an acrid taste.

OPOS'SUM, a marsupial animal of the genus *Didelphis*, which is peculiar to the American continent. There are several species, which live in woody places, and feed on eggs, insects, and fruits. The female is remarkable for having, like the kangaroos, an external pouch in the abdomen, in which she carries her young. On the ground, the opossum's progress is awkward and clumsy, but on the branches of a tree he advances with great celerity and ease, using his tail, which is prehensile, to assist his motions. Instead of flying at the approach of danger, opossums lie close to the branch on which they are clinging. When they are discovered, the branch is shaken violently, which causes them to drop to the ground ; and if the hunter is unaccompanied by dogs, they steal slowly away, and, gathering themselves into as small a compass as possible, remain perfectly quiet as if feigning death.

OPPIL'ATIVES (*oppilo*, I stop up : *Lat.*), medicines which shut up the pores

OPPOSITIFO'LIOUS (*oppositus*, placed against ; and *folium*, a leaf : *Lat.*), in Botany, an epithet for a peduncle placed opposite to the leaf.

OPPOSI'TION (*oppositio : Lat.*), in Astronomy, that aspect or situation of two stars or planets, in which they are diametrically opposite to each other, or 180 degrees apart. ——In Logic, the disagreement between propositions which have the same subject or the same predicate, but differ in quantity, in quality, or in both.——In Politics, the name given in Great Britain to that party in parliament which is opposed to the administration for the time being, and which would, most probably, succeed to power were it displaced.

OPSIOM'ETER (*opsis*, sight; and *metron*, a measure : *Gr.*), an instrument for measuring the extent of the limits of distinct vision in different persons, for the purpose of ascertaining the focal length of the lenses necessary for correcting the imperfections of the eye.

OP'TATIVE (*optativus*, expressing a wish: *Lat.*), in Grammar, a mode or form of a Greek verb, by which is expressed the wish or desire to do a thing.

OP'TICS (*optikos*, pertaining to seeing: *Gr.*), the science which treats of the laws of vision and light, whether direct, reflected, or refracted. In a more simple application *optics* is the science of direct vision only, while the science of the laws and properties of the rays of light, when considered as reflected, is called *catoptrics*, and the science of refracted rays *dioptrics ;* but in its general sense, optics comprehends the whole of that of which catoptrics and dioptrics are two parts. For information regarding the different branches of this science, recourse must be had to the different heads. [See EYE, LIGHT, MICROSCOPE, REFLECTION, REFRACTION, TELESCOPE, &c.]——OPTIC ANGLE, that which the optic axis of the eyes make with one another, as they tend to meet at some distance before the eyes. ——OPTIC AXIS, the axis of the eye, or a line going through the middle of the pupil and centre of the eye.——OPTIC NERVES, in Anatomy, the second pair of nerves from the brain, which perforate the bulb of the eye, and serve for the sense of sight.——OPTIC PLACE of a star, in Astronomy, that point of its orbit in which to our eye it appears to be.——OPTIC PYRAMIDS, a pyramid formed by rays drawn from the several points of the perimeter to the eye.

OP'TIMISM (*optimus*, best : *Lat*), that philosophical doctrine which maintains that this world, in spite of its apparent imperfections, is the best that could have been devised.

OP'TIMUS MAX'IMUS (best greatest: *Lat.*), epithets given by the ancient Romans to Jupiter, on account of his superlative greatness and goodness.

OP'TION (*optio*, from *opto*, I choose : *Lat.*). In Ecclesiastical Law, in former times, when a bishop was consecrated by an archbishop the latter had the right of naming a clerk or chaplain to be provided for by the bishop. Instead of this the bishop now makes over to the archbishop the next presentation to a benefice in the bishop's disposal. This is called the archbishop's option; it is the private patronage of the latter, and descends to his personal representatives.

OR (gold: *Fr.*), in Heraldry, a colour, otherwise called *gold*, or *yellow*, which, in engravings, is represented by small dots all over the field or charge.

OR'ACLE (*oraculum*, from *oro*, I speak: *Lat.*), in Heathen Antiquity, a pretended revelation of future events, or the will of supernatural powers, through the medium of a priest or priestess. The most famous oracles were those of Apollo at Delphi, and of Jupiter Ammon in Egypt. [See AMMON.] In the founding of cities and colonies, the introduction of new governments, the undertaking of important enterprises, and particularly in all cases of great urgency, the oracles were consulted, and rich gifts presented to them. Darkness and ambiguity in the responses were made to cover those mistakes which would otherwise have disclosed the imposture; and thus for many centuries they obtained the veneration and homage, not only of the ignorant multitude, but of monarchs, warriors, and philosophers. They were extremely venal; the rich and powerful had no difficulty in obtaining a favourable answer. It has also been asserted that they ceased at the birth of Christ. But the edicts of the emperors Theodosius, Gratian, and Valentinian, show that they were consulted, at least occasionally, down to A D 328.

O'RANG-OU'TANG (man of the woods: *Malay*), in Zoology, the Indian or red orang (*Pithecus Satyrus*), with a flat face and distorted resemblance to the human form. These animals live in swampy forests, walk erect, feed on fruits, sleep on trees, and make a shelter against the inclemencies of the weather. They are clothed with reddish brown hair, and are remarkable for their strength, as well as their ability to use weapons with the hand. They inhabit the islands of Borneo, Sumatra, &c, and attain the height of four or five feet. They have neither tail, cheek pouches, nor ischial callosities. When full-grown they have an enormous laryngeal pouch. The African animal, corresponding to the orang-outang, is the *Chimpanzee*, which still more nearly resembles man.

OR'ANGE, the well-known fruit of the orange-tree, the *Citrus Aurantium* of botanists. The orange-tree is a low evergreen, bearing leaves resembling those of the laurel, and white flowers. It is a native of India and China, but was introduced by the Portuguese into other countries; it is very long lived. The orange-tree was not cultivated in Europe till the 14th century, nor in England till 1492. It is propagated by seeds, cuttings, layers, grafting, or inoculation. The principle varieties are the sweet or China, and the bitter or Seville orange. The orange trade is a very considerable one; in 1850, 360,000 boxes of oranges were entered for home consumption in this country, each box containing about 700 lemons and oranges. The peel, when preserved, forms an article of confectionary; and the flowers yield an essential oil, little less esteemed than *ottar of roses*. The wood is fine grained, compact, susceptible of a high polish, and is employed in the arts. The productiveness of the common orange is enormous. A single tree at St. Michael's, in the Azores, where our best oranges are obtained, has been known to afford 20,000 oranges fit for packing, exclusive of the damaged fruit and the waste, which may be calculated at one-third more.

OR'ANGEMEN, the name given by the Roman Catholics in Ireland to those who were zealous adherents of William III. Also the members of an association professing those principles on account of which that prince obtained the sovereignty.

OR'ATOR (*Lat*, from *oro*, I speak), in modern usage, signifies an eloquent public speaker, or a person who pronounces a discourse publicly on some special occasion. In ancient Rome, *orators* were advocates of a superior kind, differing from the *patrons*; the latter were allowed only to plead causes on behalf of their *clients*; whereas the former might quit the *forum* and ascend the *rostrum* or *tribunal*, to harangue the *senate* or the people. The *orators* had rarely a profound knowledge of the law, but they were eloquent, and their style was generally correct and concise.

ORATO'RIO (*Ital.*; from *oratorium*, a small chapel · *Lat.*), a musical performance of a dignified character, expressing various elevated and tender affections; dramatic, but destined only for musical execution, not for theatrical action. Properly speaking, the oratorio commenced when sacred music was distinctly separated from secular. It is probable that it originated with members of a society termed the fathers of the Oratory; who, to draw youths to church, had hymns and sacred stories written in dialogue and set to music. The people were induced to hear the sermon, that they might be present at the performance of the second part. The subjects, in early times, were the Good Samaritan, Prodigal Son, Tobit's Story, &c. The excellence of the composition, the band of instruments, and the performance, brought the oratory into great repute; and this species of musical drama obtained the general appellation of *oratorio*. Oratorios soon became great favourites in Italy, where they have been constantly performed during the carnival; and they have caused the production of the noblest and most elaborate compositions by the great masters of various countries. A character more elevated than it possessed at first was given to the oratorio by Handel, who devoted all his power to the chorus. He introduced it into England in 1720, though no oratorio was publicly performed in this country for twelve years after. Oratorios were, for a long period, performed twice a week during Lent.

OR'ATORY (*oratorius*, pertaining to an orator: *Lat.*), the art by which a speaker is enabled to persuade and convince his hearers, according to the rules of rhetoric. It properly consists of four parts, namely, invention, disposition, elocution, and pronunciation. Quintilian says, 'The faculty of speech we derive from nature; but the art of speaking from observation.' To constitute oratory, the language must be just and pertinent to the subject; it must be methodical, all parts of the discourse being disposed in due order and connection; and it must be embellished, and pronounced with eloquence. Diction, manner, gesture, modulation, a methodical arrangement of the several topics to be introduced, and a logical illustration of them, are all essential requisites in oratory; and, as Cicero has observed, 'the action of the body ought to be suited to the expressions, not in a theatrical way, mimicking the words by particular gesticulations, but in a manner expressive of the general sense, with a sedate and manly inflection.'

OR'ATORY, PRIESTS OF THE, a religious order founded by Philip Neri, in 1574, for the study of theology, and for superintending the religious exercises of the devout; its members not being bound by monastic vows. This order still exists in Italy, and there is a house in London; but the more important congregation of the *Fathers of the Oratory of Jesus*, founded at Paris in 1611, is no longer in being. The different societies which adopted this name were not necessarily connected in any way; and it has been assumed by various congregations of ecclesiastics living in community, but not bound by any special vow.

ORB (*orbis: Lat.*), in Ancient Astronomy, a hollow sphere. The heavens were supposed to consist of as many such concentric spheres as there were known planets. The sun was placed in the *orbis maximus*.

ORBICULA'RIS (of a round form: *Lat.*), in Anatomy, an appellation given to the constrictor muscle of the lips, or *osculatorius*; as also to the constrictor of the upper eyelid, which rises from the upper apophysis of the maxillary bone, near the larger canthus of the eye, and surrounds the eyelid with a series of circular fibres. This latter is called the *orbicularis palpebrarum*.

ORBIC'ULATE, or ORBIC'ULAR (*orbiculatus*, rounded: *Lat.*), in Botany, an epithet for a leaf whose margin is circular, or which has its longitudinal and transverse diameters equal.

OR'BIT (*orbita*, the track of a chariot-wheel: *Lat.*), in Astronomy, the path of a planet or comet in its course round the sun; thus the earth's orbit is the curve which it describes in its annual revolution, and which is usually called the *ecliptic*. Modern astronomers have ascertained that the orbit of every planet is an ellipse, having the sun in one of its foci; and that their motions in these ellipses are such, that a radius drawn from the centre of the sun to the centre of the planet always describes equal areas in equal times. The orbits of satellites, also, are ellipses.——In Anatomy, the two cavities under the forehead in which the eyes are situated, are termed *orbits*; and these organs are set in bony sockets.

OR'CHESTRA (*orchēstra*, from *orcheomai*, I dance: *Gr.*), the space in theatres between the stage and the seats of the spectators; appropriated by the Greeks to the chorus and the musicians, by the Romans to the magistrates and senators, and by the moderns to the musicians. The word is also used to denote any erection for the performers of a concert; or any instrumental band performing together in modern concerts, operas, or sacred music.

ORCHIDA'CEÆ (*orchis: Gr.*, one of the genera), in Botany, a natural order of herbaceous endogens, inhabiting all parts of the world, except those on the verge of the frozen zone, or which are excessively dry They are remarkable for the singular form of their flowers, many of which resemble insects. Some of them grow in the earth, others inhabit rocks and the branches of trees, and a few of them are parasites. They all belong to the Linnæan cl. *Gynandria*; they are frequently of an agreeable scent; and a few, as the *Vanilla*, produce an aromatic fleshy fruit. *Salep* is prepared from the amylaceous roots of some of the terrestrial species. Many of the epiphytal species have flowers of exquisite beauty, and these have been much sought after of late years by wealthy collectors. The very irregular structure of the floral organs has been a great puzzle to botanists, and has given rise to many theories. The latest is that of Mr. Darwin, which is probably the true one He considers that the flower consists of fifteen organs very much modified and some of them confluent, viz. three sepals, three petals (with one of which, the curiously formed labellum, two stamens are confluent), six stamens arranged in two whorls, one stamen alone being in the majority of cases fertile. However, in the genus *Cypripedium* (Lady's Slipper) two stamens of the inner whorl are fertile. Lastly, three stigmas, the two lower ones being usually confluent and the upper one modified into an organ called the rostellum. According to this view there are five simple parts, namely, three sepals and two petals; and two compound parts, namely, the labellum and the column, the latter being made up of three pistils and generally four stamens

OR'CINE, in Chemistry, the name of a colouring principle obtained from lichens. [See ARCHIL.]

ORDE'AL (*urtheil: Ger*), an ancient mode of trial, in which God was asked to manifest the truth, by leaving nature to its ordinary course, if the accused were guilty; by interposing a miracle, if innocent. It was borrowed from the pagans; it prevailed, during the middle ages, throughout almost the whole of Europe; and it is still practised in some parts of the East Indies. In England it existed from the time of the Confessor to that of Henry III., who abolished it by declaration. While it lasted, the more popular modes of resorting to it were those of *fire* and of *water*—the former, among the Saxons, for freemen and persons of rank, the latter for peasants. The method of administering the ordeal by fire, in England, was by placing nine red-hot ploughshares in a line, at certain distances from each other, and requiring the person accused to walk over them barefoot and blindfold. If his feet always alighted in the spaces between the shares, so that he passed over them unhurt, his success was considered a divine assertion of his innocence; if, on the contrary, he was burnt, the disaster was a proof of his guilt. The *ordeal by water* was of two kinds. In one, the arm was plunged into boiling water—up to the wrist if it was an *expurgatio simplex*, but up to the elbow if an *expurgatio triplex;* when the accused remained unhurt, he was deemed innocent; if he was injured, guilty. In the other, the person suspected was cast into a river or pond of cold water; and if he floated without an effort to swim, it was an evidence of innocence, but if he sank he was convicted.——*Ordeal by Combat* was when a person accused of murder was obliged to fight the next relation, &c., of the person who had been slain.—*Ordeal of the Cross* consisted in the litigants both standing upright before a cross; when he who fell, or changed his position first, lost his cause, or was condemned.——*The Trial of the Eucharist*, an ordeal which was used chiefly among the clergy, consisted in the accused taking the sacrament. It was believed that, if he were guilty, he would be immediately punished for the sacrilege. Sometimes the ordeal consisted in the choice of one out of two dice; at others, in the supposed murderer being obliged to touch the body of the slain, when, if the blood flowed, he was pronounced guilty. There is no doubt that, in the severe ordeals, the clergy took precautions to preserve those whom they desired to save, and modes of trial so liable to human collusion, and founded upon unwarranted ideas of the divine interference, have deservedly passed away. But the *fact* of their former existence remains attested by a form of words still required to be used by a person arraigned for trial. Such a one, in the days of ordeals, had it in his choice to put himself upon God and his country, or upon God alone. In the former case, he professed his readiness to abide the decision of a jury; in the latter he appealed to the ordeal, as to the immediate judgment of God. A prisoner, by pleading 'not guilty,' is now deemed, in treason and felony, to put himself upon the trial by jury; but he formerly did so expressly: being asked, 'How wilt thou be tried?' he answered, 'By God and the country'—meaning, by the latter, a jury.

ORDE'AL NUT, the seed of a tree, the *Tanghinia veneniflua*, nat. ord. *Apocynaceæ*, growing in Madagascar, where persons accused of sorcery are obliged to drink an infusion, and those who escape death by poison are declared to be innocent.

OR'DER (*ordo: Lat.*), in Zoology, a group of families, each of the latter being made up of genera; in the natural system of Botany, a group of genera; in the artificial system of Linnæus, a subdivision of a class.——**ORDER**, a term used in Astronomy, and applied to the motion of a planet. Planetary bodies are said to go *according to the order of the signs*, when their apparent motion is direct, proceeding from Aries to Taurus, thence to Gemini, &c.

OR'DERS, in Architecture, those systems of the parts of a building which are subject to uniform and established proportions. An order consists essentially of two parts, the column and entablature. The column includes the base, shaft, and capital; the entablature includes the architrave, frieze, and cornice. Though the column regulates the order, a building without columns may belong to an order, if its details are in accordance with the laws of that order. The height of a column is measured in terms of its lower diameter, supposed to be divided into sixty parts called *minutes*. The column varies from seven to ten diameters in the different orders. The entablature is generally divided into ten parts, three being given to the architrave, three to the frieze, and four to the cornice: except in the Doric, where the entablature is divided into eight parts, two being given to the architrave, three to the frieze, and three to the cornice.

OR'DERS, or HO'LY OR'DERS, the different ranks of ecclesiastical persons; or the *character* of such persons. The Roman Catholic church holds that there are seven orders:—four minor, those of janitor, exorcist, reader, and acolyte; three major or holy orders, those of sub-deacon, deacon, and priest. It does not consider the episcopacy as a separate order, but merely the perfection of the priesthood. It holds that holy orders constitute a sacrament. Previously to admission to the lowest order, the tonsure is conferred; it consists in clipping and shaving a small circular space on the crown of the head; the size of this space is increased as the cleric advances through the various orders. The reformed churches acknowledge only three orders: those of deacon, priest, and bishop.

OR'DERS, RELIG'IOUS, societies bound to observe the rules prescribed by their respective founders. An order, in fact, consists in the rules to be observed by those who enter it; thus some orders are more austere than others, and one order dresses in white, while another is habited in grey or black. There are three kinds of religious orders in the Romish church—the monastic, the military, and the mendicant. The *monastic orders* are the Basilian, instituted by Basil in the fourth century; the Augustinian, termed regular and secular canons, in the 4th; the Benedictines, by Benedict, in the 6th. The *military orders* were the knights of St. John of Jerusalem, called afterwards the knights of Rhodes, and still later the knights of Malta, founded in the 11th century; the knights-templars, in the 12th; and the Teutonic knights, also in the 12th. The latter, embracing the doctrines of the reformation, ceased to exist as an order. The *mendicant orders*, created by the papacy for its own political purposes, are the Carmelites, who pretend to derive their origin from the Jewish prophets that dwelt in Mount Carmel; the Augustinians, a revival, in the 11th century, of the order supposed to have been founded by Augustine in the 4th; the Dominicans, founded by Dominick in the 13th century; and the Franciscans, by Francis of Assisi, also in the 13th century. To these may be added the Jesuits, instituted by Ignatius Loyola in the 16th century; and a number of others of inferior note, which have been devised and established, from time to time, as the energy of those already existing diminished, their zeal cooled down, or their characters became impaired.

OR'DINARY (*ordinarius*, usual: *Lat.*), a term employed in the church of Rome, to designate the bishop of the diocese.——In English Law, it means an ecclesiastical judge—a bishop, as judge in his diocese; an archbishop, for the purpose of appeal, in his province.——ORDINARY, in the Court of Sessions in Scotland, a judge who, as the case may be, decides with or without a jury.——In the Navy, a term applied to the shipping not in actual service.——ORDINARY OF NEWGATE, a clergyman who is attendant in ordinary upon the prisoners in that gaol, preaches and reads prayers in the chapel, and attends and prays with condemned malefactors at the place of execution.——ORDINARY, in Heraldry, a portion of the escutcheon, included between straight or other lines; it should comprise the fifth of the shield. The chief ordinaries in common use are the pale, fesse, bend, bar, saltier, chevron, and cross [which see]. They are generally, but not necessarily, bounded by straight lines. If the lines are serrated, the ordinary is *indented;* other deviations from the straight line are termed *ingrailed*, *invected*, &c. When an ordinary has two sides, but is varied only on the upper, it is said to be *superingrailed*, *superinvected*, &c.; if only on the lower, *subingrailed*, *subinvected*, &c

OR'DINATE (*ordino*, I arrange: *Lat.*), in Geometry, a straight line drawn from any point in a curve, perpendicular to another straight line called the *absciss*. The absciss and ordinate together are called *co-ordinates of the point.*

ORDINA'TION (*ordinatio*, from *ordino*, I appoint to office: *Lat.*), the conferring holy orders, or initiating a person into the priesthood. In the church of England, the first thing necessary on application for holy orders is the possession of a *title*—that is, a means of support as a clergyman. The candidate is examined by the bishop, or his chaplain, respecting both his faith and his erudition; and must produce various certificates, particularly one signed by the clergyman of the parish in which he has resided during a given time; he must subscribe to the thirty-nine articles; must have attained his twenty-third year before he can be ordained a deacon, and his twenty-fourth to receive priest's orders. The ceremony of ordination is performed by the bishop, by the imposition of hands on the person to be ordained. The Roman Catholic church holds ordination to be a sacrament. It also requires a title, as a preservative against the multiplication of clergymen beyond their means of support; but this, in numerous instances, is evaded, as ordination is conferred with imaginary titles—for instance, that of *poverty* (*titulum paupertatis*). The term *ordination*, in the Presbyterian church, is applied exclusively to the solemn act by which a licensed preacher or probationer is inducted into the charge of a particular parish. Hence, in the Scottish church, a clergyman can be ordained more than once.

ORD'NANCE, a general name for artillery of every description. A large amount of inventions has been applied to the construction of ordnance, either with a view to getting a maximum of strength from a minimum of material, or of making it carry a very large ball. It requires to be very carefully cast, and the toughest quality of metal is employed. Some guns have hot rings of metal slipped upon them, in order to strengthen them. Guns are cast in a solid piece, and are afterwards bored by machinery, some being rifled; and breech-loading contrivances are frequently adopted, but they have a tendency to weaken the gun.

ORES, a general name for metals as they are dug out of the earth, where they are found in the four following states:—1. *pure*, that is, by themselves, or as alloys in combination with other metals; 2 as *sulphurets*, or in combination with sulphur; 3 as *oxides*, or in combination with oxygen; and 4. as *salts*, that is, in combination with acids. Metallic ores, after being taken from the mines, in general pass through several processes before they are in a state fit for use. They are first washed in running water, to clean them from loose earthy particles, and picked, to get rid of worthless stones, for which purpose the masses are previously reduced to a smaller size if too large. They are then crushed by hand or machinery, and sifted by contrivances of various kinds. When necessary, the ores are next roasted in heaps in the open air, between low walls, or in furnaces. Roasting in the open air is practised with iron ores, and such as are pyritous or bituminous. Roasting between walls is employed with pyritic sands, and, in general, with all ores containing arsenic, sulphur, &c., which are to be exposed several times to the action of fire. Furnaces are employed in roasting iron ores, and all others which are in the state of fine powder, or when the roasting is intended to be very perfect. The various metals are subjected to different processes for their reduction. Some are operated on without difficulty; others require much art, and the addition of proper fluxes. The substances naturally combined with metals, and which mask their metallic characters, are chiefly oxygen, chlorine, sulphur, phosphorus, selenium, arsenic, water, and carbonic acid. But some metals, as gold, silver, and platinum, often occur native—that is, in the metallic state, either alone, or forming alloys by being in combination with other metals. [See METALS, MINES, &c.]

OR'GAN (*organon*, an instrument: *Gr.*), an apparatus designed for the production of some certain action or operation; in which sense, the mechanical powers, and even the veins, arteries, nerves, muscles, and bones of the human body, may be called organs. The *organs of sense* are those parts of the body by which we receive the impressions or ideas of external objects; thus, the ears are the organs of hearing, the nerves are the organs of perception and sensation, and the tongue is the organ of speech.——The 'organic world' comprises the animal and vegetable kingdoms; minerals are not *organized* bodies. The various gradations of organized being, from man, through all the inferior animals, down to the most humble plant that grows, furnish a most curious and interesting subject of study.——**ORGAN**, in Music, a wind instrument, or rather a collection of instruments under the command of a single performer. It is a very ancient contrivance, but was little used until the 8th century. The first organ mentioned in history was a small portable instrument sent by the Emperor Constantine Copronymus to Pepin, the father of Charlemagne, in 757. St. Jerome mentions an organ with twelve pairs of bellows, which might be heard at the distance of a thousand paces, or a mile, and another at Jerusalem which might be heard at the Mount of Olives. There is an organ in the cathedral at Ulm, supplied by sixteen pairs of bellows; it is 93 feet high and 28 broad, and its largest pipe is 13 inches in diameter. The celebrated organ at Haarlem is 103 feet high and 50 broad; its great organ contains 16 stops; its upper manual, 15 stops; and the pedals, of which the largest pipe is 38 feet long and 15 inches in diameter, 15 stops. The organ in the town-hall at Birmingham contains 63 stops; it has four claviers or keyboards, and four miles and a half of trackers or wooden rods; its largest pipe, 32 feet in length, is 20½ inches in diameter; and there are two octaves and a half of bells At the Industrial Exhibition in London, in 1851, an organ was exhibited having 77 stops and 4500 pipes. The machinery of the organ is very superior to what it was in former times; it acts more easily, and as there is less leakage, the bellows do not require to be of the same power. Every part of it has been greatly improved. The size of an organ is usually expressed by the length of its longest pipe; thus, one of 32 or 16 feet. It generally consists, in reality, of two or more organs—the great organ, the choir organ, the swell organ, the pedals; each having usually its keyboard or clavier. The *stops* are contrivances for throwing one or more systems of pipes, or, as they may be very well termed, instruments, in or out of action, or combining them. And they receive their names from the kind of pipes with which they are connected, as the *flute* stop, the *trumpet* stop; or from their object, as coupling stops, &c. The word stop is applied also to the system of pipes itself; thus, the *trumpet stop* comprises all the trumpets belonging to the scale. There is, in all the stops, a different pipe for each note.

ORGAN'IC DISE'ASE (*organikos*, relating to an instrument: *Gr.*), one in which the structure of some organ of the animal body is morbidly altered. In a *functional* disease, the secretions or functions only are changed.

ORGAN'IC REMA'INS (same *deriv.*), a term given by geologists to the remains of animals and plants embedded in the strata of the earth. [See GEOLOGY, FOSSILS PALÆONTOLOGY.]

ORGANIZA'TION (*organizo*, I organize *Gr.*), the act of forming or arranging the parts of a compound or complex body in a suitable manner for use or service. Also the totality of the parts which constitute, and the laws which regulate, an organized body

ORGANOG'RAPHY (*organon*, an instrument; and *graphē*, a writing: *Gr.*), the description of the structure of plants, comprehending the various forms of their tissues, the exact organization of their parts performing vital functions, the relation which one part bears to another, and the dependence of the whole upon a common system.

ORGANOL'OGY (*organon*, an instrument; and *logos*, a discourse: *Gr.*), that branch of physiology which specially treats of the different organs of animals, but more particularly those of the human species.

OR'GANON, BACON'S The *Novum Organon Scientiarum*, or New Method of studying the Sciences, forms the second part of Lord Bacon's general work, the *Instauratio Magna*, first published in 1620. The Greek word *organon* signifies an instrument. His design was to lay before the world 'the science of a better and more perfect use of reason in the investigation of things and of the true aids of the understanding,' but, unfortunately, he completed only a small portion of the work he sketched Bacon gave his method the name of induction, and he grounded it on the uniformity of the laws of nature, so that, to borrow the words of Hallam, in certain conditions of phenomena the same effects or the same causes may be assumed. He endeavoured to establish these words on a more exact and finer process of reasoning than partial experience can effect. For the recurrence of antecedents and consequences does not prove a necessary connection between them, unless we can exclude the presence of all other conditions which may determine the event. Long and continued experience of such a recurrence, indeed, raises a probability of a necessary connection; but the aim of Bacon was to supersede experience in this sense and to find a shorter road to the result; and for this his methods of exclusion are devised. As complete and accurate a collection of facts connected with the subject of enquiry as possible is to be made out by means of that copious natural history which he contemplated or from any other good sources. These are to be selected, compared and scrutinized according to the rules of natural interpretation delivered in the second book of the *Novum Organon*, or such others as he designed to add to them; and if experiments are admissible these are to be conducted according to the same rules. Experience and observation are the guides through the Baconian philosophy, which is the handmaid and interpreter of nature.

OR'GIA (*Gr.*, probably from *erdo*, I perform sacred rites), in Antiquity, feasts and sacrifices performed in honour of Bacchus, instituted by Orpheus, and chiefly celebrated on the mountains by wild, distracted women, called *Bacchæ*. These feasts were held in the night; hence the term 'nocturnal orgies.' [See BACCHANALIA.]

OR'GUES (*orgue*, an organ: *Fr.*—from the appearance of the machine), in the Military art, a machine composed of several musket barrels united, by means of which several explosions are made at once, to defend breaches. [See INFERNAL MACHINE.] Also, long thick pieces of timber, pointed with iron, and hung over a gateway, to be let down in case of attack.

ORICHAL'CUM (*oros*, a mountain; and *chalkos*, brass: *Gr.*), in Antiquity, a metallic substance resembling gold in colour, but very inferior in value. It was known both to the Greeks and Romans; and although it has been a matter of dispute what this metal could be, it is highly probable that it was either the same kind of composition as our brass, or a mixed metal very analogous to it

O'RIEL, in Gothic Architecture, a bay window, and sometimes, with early writers, a recess. Oriel windows were usually ornamented with tracery. The fine oriel in Wolsey's Hall at Hampton Court may be cited as an example.

O'RIENT (*oriens*, rising: *Lat.*), in old Geography and Astronomy, the east, or eastern point of the horizon; thus called, because it is the point where the sun rises. ——In Surveying, *to orient* a plan is to mark its bearing with regard to the cardinal points.

ORIEN'TALS (*orientalis*, belonging to the east: *Lat.*), the natives or inhabitants of the eastern parts of the world. It is common to give this appellation to the inhabitants of Asia from the Hellespont and Mediterranean to Japan.

OR'IFLAMME (*auri flamma*, a blaze of gold: *Lat.*), the old royal standard of France, originally the church banner of the abbey of St. Denis. It was a piece of red taffeta fixed on a gilt spear, in the form of a banner, and cut into three points, each of which was adorned with a tassel of green silk.

OR'IGENISTS, in Church History, followers of Origen of Alexandria, a celebrated Christian writer, who lived in the third century, and held that the souls of men have a pre-existent state; that they are holy intelligences, and sin before they are united to the body; that the torments of the damned shall not be eternal, but that the devils themselves shall yet be happy, &c.

ORIL'LON (*Fr.*), in Fortification, a round mass of earth faced with a wall, raised on the shoulder of those bastions that have casemates, to cover the cannon of the retired flank.

O'RIOLE (*aureolus*, golden-coloured: *Lat.*), the *Oriola galbula* of ornithologists, a bird with yellow plumage, belonging to the family of thrushes which spends the summer in Europe, and the winter in more southern latitudes. There are other species well known in the United States of America for the richness of their plumage and the peculiar form of their nests

ORI'ON, in Astronomy, one of the forty-eight constellations arranged by Ptolemy. It is in the southern hemisphere, with regard to the ecliptic, but the equinoctial passes nearly across its middle. It contains seven stars, which are very conspicuous to the naked eye. Of these three are in a line and form the belt, pointing in one direction to Sirius, the Dogstar, and in the other to the cluster of the Pleiades. Immediately below the belt is Rigel in the foot of Orion Above the belt are Bellatrix on the right shoulder and Betelguez on the left shoulder. South of the belt is a cluster of stars forming the sword or the nebula of Orion. The name Orion is of great antiquity, and occurs in Job, Amos, and Isaiah.

ORLAN'DO FURIO'SO, the title of Ludovico Ariosto's great poem, published in 1516 at Ferrara There are forty-six cantos in OTTAVA RIMA, and the subject is the fabulous adventures of the Christian Knights and Moorish paladins of Charlemagne's age. The hero is Orlando (or Rolando), the champion of the Christians, who had been the hero of a poem, entitled 'Orlando Innamorato,' by Boiardo, who had represented him in love with Angelica, a Saracen princess. Ariosto took up the story, and painted Orlando driven mad by jealousy, in which state he does many absurd acts, but is at last restored to his senses by having his wits brought back to him from the moon! The war between Charlemagne and the Moors goes on throughout the poem, until the latter are driven out of France. There are besides many episodes, with abundance of giants, magicians, flying horses, enchanted palaces, and other wild creations of the fancy; so that Cardinal Ippolito, to whom the poem was dedicated, may very well have asked the author, as it is reported he did, where he had picked up so many absurdities. The poem has been translated repeatedly into English, and most European languages possess translations. The Italian reprints have been numerous, and its popularity amongst the writer's countrymen has been quite equal to that of Tasso's epic, the Jerusalem Delivered; although out of Italy the latter poem has perhaps been the greater favourite.

OR'LOP (*overloft: Teut.*), in a ship of war, a platform of planks laid over the beams in the hold, on which the cables are usually coiled. It contains also sail-rooms, carpenters' cabins, and other apartments.

ORNITH'OLITE (*ornis*, a bird; and *lithos*, a stone: *Gr.*), a *fossil bird*. The name is also applied to stones of various colours, bearing the figure of birds.

ORNITHOL'OGY (*ornis*, a bird; and *logos* a discourse: *Gr.*), that branch of natural history which treats of birds, a class in the animal sub-kingdom In the majority of birds every part of the frame is marked by lightness and buoyancy; their plumage admirably protects them from cold and moisture; their wings, although of the lightest materials, are furnished with muscles of such power as to strike the air with great force, and to impel their bodies forward with rapidity, whilst the tail acts as a rudder, by which their course can be directed at pleasure. The most characteristic part of a bird's internal structure is that connected with its power of flight. The bones of the wing are those of the fore arm modified. The muscles which set the wings in motion are attached to a widely expanded sternum or breast bone, with which is connected the fork-like elastic bone called the *furcula*, or merry-thought, which serves, with the aid of the clavicles, to keep the wings apart in the act of flying. The voice of birds is a gift of nature, by which the greater part are distinguished from all the rest of the animal creation. At the bifurcation of the windpipe is a glottis supplied with appropriate muscles, called the lower or inferior larynx; it is here that the voice is formed; the vast body of air contained in the air-cells contributes to the force, and the windpipe, by its form and movements, to the modification of the voice. The gift of song is bestowed on the male birds only, and their notes are mostly an expression of love; hence they are heard singing chiefly at the time of pairing. Almost all birds incubate or hatch their eggs, by keeping them at a uniform temperature by brooding over them; and before laying, they are directed by instinct to the operation of building a nest or habitation for their young. Birds, although the most marked of all the classes of animals, resemble each other so closely in their general characters that their subdivision is extremely difficult. Various classifications have been proposed. The following is one of the latest. 1. *Raptores* or *Accipitres*, birds of prey: as eagles, vultures, and hawks. These are a rapacious tribe, feeding on carcases, however putrid, but, unless pressed with hunger, seldom attacking living animals; they are bold, gregarious, fly slowly unless when very high in the air; and they have an exquisite sense of smell. 2. *Insessores*, or perching birds: as thrushes, nightingales, sparrows, larks, &c.; and, from including the smaller birds, they are sometimes termed *Passeres*. 3. *Scansores*, or climbers: as parrots and woodpeckers. 4. *Columbæ*, the dove and pigeon family. 5. *Gallinæ* or *Rasores*, gallinaceous or game birds, including our barn-door fowls, pheasants, partridges, grouse, curassows, &c. 6. *Struthiones*, including the ostrich, cassowary, emu, &c. In these the wings are so little developed that the birds are unable to fly. 7. *Grallæ* or *Grallatores*, the waders, including cranes, herons, snipes, plovers, rails, &c. 8. *Anseres* or *Natatores*, web-footed birds, such as the swan, duck, auk, petrel, and gull. These orders are subdivided into several families.

ORNITHORHYN'CHUS (*ornis*, a bird; and *rhunchos*, a beak: *Gr.*), an Australian four-footed animal of singular structure. Its skin is clothed with soft fur, the feet are webbed, and the mouth is furnished with a bill like a duck's. It is a mammal allied to the kangaroos, about 20 inches in length. It lives in the neighbourhood of water, and its habits are very shy.

OROG'RAPHY, or OROL'OGY (*oros*, a mountain; and *grapho*, I write, or *logos*, a discourse: *Gr.*), physical geography as it relates to mountains. Descriptions of the height and form of mountains and their branches, the trending directions of mountain chains, and their relations to the rest of the country, belong to orography. As to the measurement of heights, see **HYPSOMETRY**.

OR'PIMENT (*auripigmentum*, gold paint: *Lat.*), *yellow sulphuret of arsenic:* it is the basis of the paint called *king's yellow*.

OR'RERY (from the Earl of Orrery, for whom the first was made), a machine representing the motions, relative magnitudes, and distances of the bodies composing the solar system. It is calculated to impart a very imperfect, and even inaccurate, idea of what it is intended to represent. It differs from the *planetarium*, in giving the revolution of one or more of the satellites.

OR'RIS ROOT, the root of a white-flowering species of *Iris*, the *Iris Florentina*, a native of the south of Europe. It is exported from the Mediterranean in considerable quantities, and is used in making perfumed powders, to which it communicates an odour resembling that of violets.

OR'THODOX (*orthos*, right; and *doxa*, opinion: *Gr.*), having a right judgment in matters of religious faith. Every sect has its own notions of orthodoxy.

ORTHODROM'ICS (*orthos*, right; and *dromos*, a course: *Gr.*), in Navigation, the art of sailing on the arc of a great circle; which is the shortest distance between two points on a sphere.

ORTHO'EPY (*orthos*, right; *epos*, a word: *Gr.*), a right pronunciation of words. It refers to questions of sound, whereas orthography refers to spelling.

ORTHOG'NATHOUS (*orthos*, straight; *gnathos*, a jaw, *Gr.*), a term applied by comparative anatomists to skulls such as those of the Calmucks, which have the profile of the face almost vertical; opposed to *prognathous*.

ORTHOG'RAPHY (*orthographia:* from *orthos*, right; and *grapho*, I write: *Gr.*), in Architecture, a geometrical representation of an elevation or section of a building.——In Fortification, the profile or representation of a work in all its parts, as it would appear if perpendicularly cut from top to bottom.——In Geometry, the art of drawing a front view of an object, so as to represent the height of each part; so called from its determining things by perpendicular lines falling on the geometrical plan.——In Grammar, that division which teaches the nature and properties of letters, and the correct spelling and writing of words. — *Orthographic Projection of the Sphere*, that projection which is made upon a plane passing through the middle of the sphere, by an eye placed vertically at an infinite distance. In other words, every point of the hemisphere is referred to its diametral plane or base. In this projection only the central parts are truly represented; distortion increases as the edges of the map are approached.

ORTHOP'TERA (*orthos*, straight; *ptera*, wings, *Gr.*), in Entomology, an order of four-winged insects with incomplete metamorphoses. It includes the grasshoppers, locusts, crickets, and earwigs. The wings when present, for in some genera the females never possess any, are leathery or membranous, traversed by numerous veins. The front pair usually lap more or less over each other The hinder pair are nearly semi-circular in form, and their veins radiate from the point of attachment. When the insect is at rest they lie straight down the back, instead of being folded transversely as amongst the beetles.

OR'TIVE (*ortus*, a rising *Lat.*), in Astronomy, *rising* or *eastern*. The *ortive* amplitude of a planet is an arc of the horizon intercepted between the point where a star rises and the east point of the horizon—the point where the horizon and equator intersect.

OR'TOLAN (*Fr.*), or *Green-headed Bunting*, the *Emberiza hortulana* of ornithologists, a bird greatly esteemed for the delicacy of its flesh, when in season It belongs to the *Fringillidæ*, and is a native of northern Africa; but in summer and autumn it visits southern, and sometimes even central and northern, Europe It is about the size of a lark; and seems identical with the *miliaria* of Varro, which was sold at such enormous prices to the epicures of Rome.

ORYCTOG'NOSY, ORYCTOG'RAPHY, or ORYCTOL'OGY (*oruktos*, digged out; and *gnōsis*, knowledge; *grapho*, I write; or *logos*, a discourse: *Gr*), that branch of science which treats of fossil organic remains——Also those parts of mineralogy which have for their object the classification, description, nomenclature, and arrangement of minerals. The terms are synonymous with *mineralogy*, which is almost always employed

OS'CAN, an ancient Italian language spoken by the Samnites, who lived on the south of Rome, of which a few fragments remain It had not entirely disappeared as a spoken tongue in the time of the earlier emperors

OSCILLA'TION (*oscillatio*, from *oscillo*, I swing *Lat*), in Mechanics, the vibration, or alternate ascent and descent, of a pendulous body. In falling down the curve, it generates as much force as, but for the resistance of the air, and friction at the centre of motion, would carry it up to the height from which it descended; and, were it not for these, it would continue to descend and ascend through equal spaces. Oscillations in small circular or in cycloidal curves are performed in equal times, the length of which depends on the length of the pendulum, being proportional to its square root, thus, a pendulum four times as long as another will vibrate twice as slowly.——The *centre of oscillation* is that point in a pendulous body at which all its matter being collected, the oscillations would still be performed in the same times. The *axis of oscillation* is a straight line passing through the point of suspension, parallel to the horizon, and perpendicular to the plane in which the oscillation is made

OSCULA'TION (*osculor*, I kiss: *Lat.*), in Geometry, one curve is said to osculate another, when they are in contact in such a way that the greatest possible number of points are common to both.——OSCULATION, in Medicine, the intercommunication of blood-vessels.

OSI'RIS, I'SIS, HO'RUS, the three principal deities of the Egyptian mythology. The first was worshipped under the form of bulls, and his statues frequently had the horns of a bull A cow was sacred to Isis, who was considered the sister of Osiris, and her statues had horns. She was often represented holding a sistrum with a lotus on her head, and one of her statues bore the celebrated inscription, 'I am all that has been, that shall be; no mortal has hitherto taken off my veil' Horus was the son of Isis and Osiris, and he seems to have corresponded with the Apollo of the Greeks. He is often represented either as sitting on the lap of Isis, or as trampling on a crocodile

OS'MAZOME (*osmē*, odour; and *zōmos*, broth: *Gr*), the extractive matter of muscular fibre, which gives its peculiar smell to roast meat, and its flavour to broth and soup

OS'MIUM (*osmē*, odour *Gr.*—from the pungent smell of its volatile peroxide), a rare metal, generally found in the ores of platinum. It is, in the most compact state in which it has yet been obtained, of a bluish-white colour; and though somewhat flexible in thin plates, it is easily powdered. It cannot be fused or volatilized, for when heated to redness it combines with the oxygen of the atmosphere and forms osmic acid, which has an irritating and dangerous vapour. The specific grav. of osmium is 10, its equivalent 99·6

OS'PREY (*orfraie*: *Fr.*), or *Fishing Hawk*, the *Pandion haliætus* of ornithologists, a bird of the falcon family inhabiting Europe and North America. It is nearly two feet in length. It feeds on fish, which it takes by suddenly darting upon them when near the surface of the water

OSSIFICA'TION (*os*, a bone; and *facio*, I make: *Lat.*), the formation of bone, or the change of any soft solid of the body into bone.

OSSILE'GIUM (*Lat.*: from *ossa*, bones; and *lego*, I collect), in Antiquity, the act of collecting the bones and ashes of the dead after the funeral pile was consumed, which was performed by the friends or near relations of the deceased, who first washed their hands and unfastened their garments. When all the bones were collected, they were washed with wine, milk, perfumes, and the tears of friends; after this ceremony was over, the relics were put into an urn, and deposited in a sepulchre.

OSS'UARY (*ossuarium*: *Lat.*), a place of deposit for the bones of the dead.

OSTEOCOL'LA (*osteon*, a bone; and *kolla*, glue: *Gr.*), a term applied to the glue obtained from bones

OSTEOL'OGY (*osteon*, a bone; and *logos*, a discourse: *Gr.*), that part of anatomy which treats of the bones

OS'TRACISM (*ostrakismos*: *Gr.*), in Grecian Antiquity, a kind of popular judgment or condemnation among the Athenians, by which such persons as had power and popularity enough to attempt anything against the public liberty were banished for a term of ten years. The punishment was called by this name from the Greek word *ostrakon*, which properly signifies a tile or shell; but, when applied to this object, it is used for the billet on which the Athenians wrote the names of the citizens whom they intended to banish, and which was a tile or a shell. If 6000 of the shells deposited in the place appointed were in favour of the banishment of the accused, it took effect; otherwise he was acquitted. After the expiration of ten years, the exiled citizen was at liberty to return to his country, and resume possession of his wealth and all his civil privileges. To this sentence no disgrace was attached; for it was never inflicted upon criminals, but only upon those who had excited the jealousy or suspicion of their fellow-citizens, on account of the influence they had gained by peculiar merit, wealth, or other causes. Aristotle and Plutarch called ostracism 'the medicine of the state.'

OS'TRICH (*autruche: Fr.*), a bird distinguished by its immense size and peculiar habits, as well as by the beauty and value of its plumage. The African or true ostrich (*Struthio Camelus*) is from seven to nine feet high from the top of its head to the ground; most of this, however, is made up by the great length of its neck. Its thighs and the sides of the body are naked, and the wings are so short as to be unsuited for flying. It is different from all other birds, in having only two toes, which correspond to the two outermost in the rest of the class. It inhabits the burning and sandy deserts of Africa in large flocks; and its speed in running exceeds that of the fleetest horse, which renders the ostrich-hunter's task exceedingly laborious. In running, it dashes the stones behind it with great force. The female lays from ten to twelve eggs in a hole in the sand; and, although she does not incubate them continually, no bird has a stronger affection for its offspring, or watches its nest with more assiduity; always brooding over her eggs at night, and leaving them only during the hottest part of the day. They are said to be a great delicacy, and are prepared for the table in various ways. One of them is equal in weight to eleven hen's eggs. The digestive powers of the ostrich appear almost incredible, and its voracity is equal to its digestion. In South America there are two species of ostrich, both smaller than the African species.

OT'TAVA RI'MA (*Ital.*), the name given to the stanza in which the 'Orlando Furioso,' 'Gerusalemme Liberata,' and many other Italian poems are written. There are eight lines and three rhymes. The first, third, and fifth lines rhyme together, and the second, fourth, and sixth; the stanza then ends with a couplet. The rhyming words are trochees.

OT'TER, the *Lutra vulgaris*, a quadruped belonging to the family of *Felidæ*, remarkably sagacious in the construction of its dwelling under ground. It inhabits the banks of rivers, and feeds principally on fish. The feet are palmated, and the tail is half the length of its body, the fur of which is much esteemed. It is fierce and crafty when attacked, but may easily be tamed when young, and taught to catch fish. When the otter, in its wild state, has taken a fish, it carries it on shore, and devours the head and upper parts, rejecting the remainder. When hunted by dogs, it defends itself very obstinately, often inflicting on them the severest wounds.——The American otter (*Lataxina mollis*) is taken in great numbers in Canada, nearly 20,000 skins having been sent to England in one year by the Hudson's Bay company. Its habits are the same as those of the European species, but it is larger, and the fur much more valuable. The common mode of taking these animals is by sinking a steel trap near the mouth of their burrow.——The *sea-otter* (*Enhydra marina*), which is a much larger species than the others, is about the size of a large mastiff, and weighs 70 or 80 lbs. When in full season, the fur is a fine glossy black, and sells at very high prices in China, where the skins are usually obtained. It is exclusively found between the 49th and 60th degrees north latitude, and always frequents the coast.

OT'TO, or AT'TAR OF RO'SES, the most agreeable perfume known; being an aromatic oil obtained from the flowers of the rose, but in such small quantities that half an ounce can hardly be procured from a hundred pounds of the petals. It is brought from Turkey and the East Indies; and, when genuine, is sold at a very high price. It is frequently adulterated with some essential or fixed oil, or with spermaceti; but the adulteration may be detected by testing it in a watch-glass, with a drop of sulphuric acid, if the otto is pure, it will remain colourless; if adulterated, it will be darkened. It is chiefly manufactured at Ghazeepore, a place celebrated throughout India for the beauty and extent of its rose-gardens, which occupy many hundred acres The otto is obtained, after the rose-water is made, by setting it out during the night, until sunrise, in large open vessels, exposed to the air, and then skimming off the essential oil which floats on the top. To produce one rupee's weight of otto, 200,000 well-grown roses are required. The juice, even on the spot, is extremely dear, a rupee's weight being sold at the bazaar for 8*l.* sterling, and at the English warehouse for 10*l.*

OT'TOMAN, an appellation given to what pertains to the Turks or their government; as, the *Ottoman* power or empire. The word derived its origin from Othman, the name of a sultan who assumed the government about the year 1300.——A peculiar kind of sofa much used in Turkey, and introduced into Europe.

OUNCE (*uncia: Lat.*, in general the twelfth part of anything), in Commerce, a weight of different amounts: in avoirdupois weight, it is the sixteenth part of a pound, or 437½ grs.; in troy weight, the twelfth part of a pound, or 480 grs.; in apothecaries' weight, it is equal to eight drams.——OUNCE, in Zoology, the *Leopardus uncia*, an animal inhabiting the mountainous regions of Asia. Its tail is long and thick, the spots on the thick fur are pale and of irregular shape. It approaches the leopard in size. The jaguar of South America is sometimes called the Ounce.

OUT'LAWRY, the putting a man out of the protection of law; or the process by which a man is deprived of that protection. To kill an outlaw is murder, unless it happens in an attempt to apprehend him; any one may arrest an outlaw, on a criminal prosecution, for the purpose of bringing him to be dealt with according to law. Outlawry is a punishment inflicted for a contempt, in refusing to be amenable to the jurisdiction of a competent court. It is issued against a defendant, after he has been five times proclaimed at a county court; but, should he have previously left the kingdom, he can set it aside, by a writ of error, or on motion. In civil cases, the effect of outlawry is a forfeiture of personal goods and chattels at once; and of chattels real, and profits of lands, when found on inquisition.

OUT'RIGGER, in Nautical language, any projecting spar, or piece of timber, used for extending ropes or sails, or for any other temporary purpose.

OUT'WORKS, in Fortification, all those works of a fortress which are situated without the principal wall, within or beyond the principal ditch. They are designed not only to cover the body of the place, but also to keep the enemy at a distance, and prevent his taking advantage of the depressions and elevations usually found in the places about the counterscarp, which might serve either as lodgments, or as rideaux, to facilitate the carrying on trenches, and planting batteries against the place: such are ravelins, tenailles, horn-works, crown works, &c.

O'VAL (*ovum*, an egg: *Lat.*), an oblong curvilinear figure, resembling the longitudinal section of an egg. The mathematical oval, which is a regular figure equally broad at each end, and therefore not strictly egg-shaped, is called an *ellipsis*.

O'VATE (*ovatus*, shaped like an egg: *Lat.*), *egg-shaped*, as an *ovate* leaf.

OVA'TION (*ovatio*, from *ovis*, a sheep: *Lat.*), in Roman Antiquity, a lesser triumph allowed to commanders who had obtained a bloodless victory, or defeated an inconsiderable enemy. It derived its name from sheep being sacrificed on such occasions, instead of bullocks, which were the victims in a triumph. Ovations, but not triumphs, were permitted in civil wars.

OVERRA'KE, in sea language, a term signifying that the waves break in upon a ship lying at anchor; as, the waves *overrake* her, or she is *overraked*.

O'VERT ACT (*ouvert*, open: *Fr.*), in Law, a plain and open matter of fact, serving to prove a design; distinguished from a secret intention not carried into effect, and even from words spoken. An overt act must be alleged in every indictment for high treason.

O'VERTURE (*ouverture*: *Fr.*), in Music, a prelude or introductory symphony, chiefly used to precede great musical compositions, as oratorios and operas; and intended to prepare the hearer for the piece which is to follow, often by concentrating its chief musical ideas, so as to give a sort of outline of it in instrumental music.

O'VIDUCT (*ovum*, an egg; and *duco*, I conduct: *Lat.*), in Natural History, a passage which conveys the egg from the ovary to the uterus, or to an external outlet. In the *Mammalia*, it is termed the Fallopian tube, from Fallopius having first described that of the human subject.

OVIPOS'ITOR (*ovum*, an egg; and *pono*, I place: *Lat.*), in Entomology, the organ by which an insect conducts the eggs into the appropriate nidus. It is frequently armed at the extremity with a piercing apparatus.

OV'OLO (*Ital.*; from *ovum*, an egg: *Lat.*), in Architecture, a convex moulding, the section of which is usually the quarter of a circle, and often called the *quarter round* The Grecian ovolo resembles more the form of an egg.

OWL, the name of birds belonging to the large family *Strigidæ*. Owls are distinguished by having a large head, very large eyes encircled by a ring of fine feathers, and a harsh screeching voice. From the enormous size of the pupils of their eyes, they are enabled to see well in the night, but in the day their sense of sight is imperfect, hence during this time they keep concealed in some secure retreat. Their hearing is very acute, and their plumage soft and loose, enabling them to fly without noise, and thus to come on their prey in an unexpected manner. They breed in fissures of rocks, or in holes of trees, and feed on small birds, mice, bats, &c. There are many species, but the most common in this country is the barn owl, *Strix flammea*, which frequents barns, towers, churches, old ruins, &c., generally leaving its haunts about twilight, and exploring the neighbouring woods for its prey during the night The tawny owl, *Syrnium aluco*, is the one with the well-known hooting call, *to-woo*. The great horned owl of America, *Bubo virginianus*, with a tuft of feathers at each ear, is nearly as large as the golden eagle.

OWL'ING (so called from its being usually carried on in the night) was the offence of transporting wool or sheep out of England, contrary to the statute. It was formerly a capital crime; but the law has been repealed

OX (*ochs*: *Ger.*) The common ox, *Bos Taurus*, has a flat forehead, and round horns placed at the two extremities of a projecting line which separates the front from the occiput; the horns, however, differ so much in their form and direction in the numerous varieties, that no specific characteristic can be based upon them. There is scarcely any part of this valuable animal that is not useful to mankind. Its flesh is the principle article of animal food; the horns are converted into combs, knife-handles, &c.; the bones form a cheap substitute for ivory; the blood is employed in the manufacture of prussian blue; the hide is made into a strong leather; the hair is used by plasterers, and the fat is employed in the formation of candles and soap. Besides the differen. varieties of the common ox produced by domestication, there are several others, as the Abyssinian ox, having the horns pendulous, adhering only to the skin, and the African ox, having the body snowy, and hoofs black, &c.

OX'ALATE, in Chemistry, a salt formed by a combination of oxalic acid with a base, as the *oxalate* of *ammonia*.

OXAL'IC A'CID (*oxalis*, sorrel; from *oxus*, sour: *Gr.*), in Chemistry, an acid first obtained from sorrel, but now readily produced by the action of nitric acid on sugar. It is a compound of carbon, oxygen, and hydrogen. It is a violent poison, and has sometimes been swallowed by mistake for Epsom salts; from which, however, it is distinguishable by its intensely sour taste. The best antidote, in such cases, is a mixture of chalk and water, which may be effective if swallowed at once. Oxalic acid, as also its salts in solution, give an insoluble precipitate with solutions containing lime, or its salts; and hence oxalic acid and lime, or its salts, are employed as tests for each other.

OX'ALIS (sorrel: *Gr.*), in Botany, a genus of plants, nat. ord. *Oxalidaceæ*. The species have tuberous roots and trifoliate leaves. The common oxalis (*O. acetosella*) has been thought to be the Shamrock, as it flowers about St. Patrick's day. Some of the species have sensitive leaves, and of others the tubers are eaten as a substitute for potatoes.

OX'IDE (*oxus*, sharp; and *eidos*, form: *Gr.*), the combination of a simple or compound element with oxygen, in smaller quantity than is required to produce acidity. To designate oxides having progressively increasing quantities of oxygen, the first syllables of the Greek numerals are prefixed: thus, *protoxide, deutoxide, tritoxide*, &c. And *hyper*, or *per*, is used with the oxide containing it in the largest quantity, as *per-oxide* of iron. When the combination is equivalent to an atom of the base united with an atom and a half of oxygen, it is a *sesqui-oxide*.

OX'YGEN, or OX'YGEN GAS (*oxus*, acid; and *gennao*, I produce: *Gr.*—from being at first considered the only cause of acidity), in Chemistry, a permanently elastic fluid, invisible, inodorous, and a little heavier than atmospheric air. It is the respirable part of air, and was called *dephlogisticated air*, also *vital air*, from its being essential to animal life; but it received its present name from its property of giving acidity to compounds in which it predominates. Oxygen is the most extensively diffused of material substances. In union with azote or nitrogen, it forms atmospheric air, of which it constitutes about a fifth part. Water contains eight ninths by weight of it, and it exists in most vegetable and animal products, acid salts, and oxides. It is also a very energetic agent, and the history of its properties and combinations forms the most important subject in chemistry. Oxygen gas nowhere exists pure and uncombined; hence certain processes are required to obtain it in an insulated form; these consist, chiefly, in applying heat to some of its compounds, in which it is retained by a weak attraction. Its most striking property is that of exciting and supporting combustion. A candle or wax taper, freshly extinguished, is relighted on being immersed in a jar of this gas. A partially kindled piece of charcoal, on being introduced into it, inflames with great rapidity and brilliancy But the most interesting example of combustion in this gas is that of iron or steel wire, which only require to have their temperature elevated, by the previous ignition of a piece of sulphur and a small bit of iron turnings, attached to them at the extremity, in order to be kindled into the most vivid and intense combustion, burning with sparks and scintillations. The sulphur ignites the iron turnings, and the latter the iron or steel wire. Atmospheric air sustains life only from the oxygen it contains; the exhausted blood abstracts it from the atmosphere by means of the respiratory apparatus, giving off at the same time carbonic acid gas But *pure* oxygen proves too highly stimulating for animal existence.

OX'YGON (*oxus*, sharp; and *gonia*, an angle: *Gr.*), in Geometry, a triangle having three acute angles.

OX'YMEL (*oxus*, acid; and *meli*, honey: *Gr.*), a syrup made of honey and vinegar boiled together. It possesses aperient and expectorant qualities, and is sometimes made a vehicle of medicines.

OXYMO'RON (*Gr:* from *oxus*, clever; and *mōros*, foolish—because, though the expression is seemingly incorrect, it is really accurate), a Rhetorical figure, in which an epithet of a quite contrary signification is added to a word; as *tender cruelty*.

OXYMURIAT'IC A'CID, in Chemistry, the name by which *chlorine* was formerly known; being at first considered a compound of oxygen and muriatic acid.

OXYO'PIA (*oxuōpia*: from *oxus*, sharp; and *ōps*, the eye: *Gr.*), the faculty of seeing more acutely than usual. The proximate cause is a preternatural sensibility of the retina; and it has been sometimes known to precede the gutta serena.

O'YER AND TER'MINER (*oyer*, to hear; and *terminer*, to end: *Norm. Fr.*), a court which, by virtue of the king's commission, hears and determines certain specified offences.

O YES (corrupted from the French *oyez*, 'hear ye'), the expression used by the crier of a court, in order to enjoin silence, when any proclamation is made.

OYS'TER (*oester*: *Dutch*), a well-known edible shell-fish, belonging to the genus *Ostrea*. In many places oysters are *planted*, as it is called; that is, large artificial beds are formed in favourable situations, where they are permitted to fatten and increase. They attain a size fit for the table in about a year and a half and are in their prime at three years of age. The best British oysters are said to be those found near Purfleet, and the worst near Liverpool. They are brought from the coasts of the maritime counties, and planted on beds along the shore; they thrive best in a mixture of salt and fresh water. About 200 small vessels are employed in dredging for oysters. British oysters were highly prized by the ancient Romans, and were generally eaten at the beginning of the entertainment.

OZO'NE (*ozo*, I have a smell: *Gr.*), a substance occasionally existing in the atmosphere, and having a peculiar odour resembling that produced when repeated electric sparks, or electric discharges from a point, are transmitted through the air. It is supposed to be an allotropic form of oxygen. It is also formed in certain cases of the slow action of air upon phosphorus. The ozone existing from time to time in the atmosphere has been supposed to have an influence on the health of the community, and observations with regard to it are frequently made by means of an apparatus called an ozonometer, the essential part of which consists of strips of paper steeped in a mixture of starch and iodide of potassium. Ozone turns the paper brown, the tint varying with the quantity of ozone.

P

P, the sixteenth letter and twelfth consonant of the English alphabet, is a labial articulation, formed by expressing the breath somewhat more suddenly than in emitting the sound of *b*. When *p* stands before *t* or *s*, it is mute, as in the words *psalm*, *psychology*, *ptarmigan*, &c.; and when before *h*, the two letters thus united have the sound of *f*, as in *philosophy*. As an abbreviation, in Latin words, P. stands for *Patres:* as P. C. *Patres Conscripti* (conscript fathers). For *Publius:* P. F. *Publii Filius* (the son of Publius). For *Pontifex:* P. M. *Pontifex Maximus* (chief priest). For *Populus:* P. R. *Populus Romanus* (the Roman People); and S.P.Q.R. *Senatus Populusque Romanus* (the senate and people of Rome), &c. We use it for *post*, as P. M. *Post Meridiem* (after noon); and for *Parliament*, as M.P. *Member of Parliament*. Physicians for *partes*, as P Æ. *partes æquales* (equal parts of the ingredients); *ppt.*, for *præparatus* (prepared), &c.——In Music, *p.* stands for *piano*, or softly; *pp.* for *più piano*, or more softly; and *ppp.* for *pianissimo*, or very softly.

PAB'ULUM (*Lat.*, from *pascor*, I feed). In Medicine, such parts of our common aliments as are necessary to recruit the animal fluids.

PA'CA, the *Cœlogenys Paca* of zoologists, a small rodent animal of America, bearing some resemblance both to the capybaras and agoutis. It is sometimes called the *spotted cavy*. It is a burrowing nocturnal animal, living in damp woods and feeding on vegetables.

PACE (*pas: Fr.*), the space between the two feet of a man in walking, usually reckoned two feet and a half; but the geometrical pace, or the whole space passed over by the same foot from one step to another, is five feet. The ancient Roman *pace*, the thousandth of a mile, was five Roman feet, or about 58·1 English inches; and hence the Roman mile, or *mille passus*, was 1614 yards, or nearly 150 yards less than the English mile.

PACHA', or PASHAW' (*padi shah*, the foot of the shah: *Pers.*), the military governor of a Turkish province. The most distinguished of the pachas have three horsetails carried before them: the inferior, two. Though the pasha is appointed and removed at the will of the sultan, his power is very great, and the provincial administration is in his hands. This word is also written *bashaw*.

PACHYDER'MATA (*pachus*, thick; and *derma*, a skin: *Gr.*), in Zoology, the name given by Cuvier to an order of mammalia corresponding with the family of *Elephantidæ* of later writers. It comprehended the elephant, mastodon or North American mammoth, hippopotamus, rhinoceros, tapir, hog, &c.

PACIF'IC (*pacificus*, peaceful: *Lat.*), the appellation given to the ocean situated between America on the east, and Asia and Australia on the west; so called on account of its *supposed* exemption from violent tempests. It is the greatest expanse of water on the globe.

PA'CO, or PA'COS, the ALPACA of South America.

PAD'DOCK-PIPE (*pada*, a toad: *Sax.*), in Botany, a plant of the genus *Equisetum*.

PA'DDOCK-STOOL (same *deriv.*), a name sometimes given to various species of fungus, the *toadstools*.

PAD'ISHAH (*pad*, protector; and *shah*, prince: *Pers.*), a title assumed by the Turkish sultan. Formerly the Ottoman Porte applied that name only to the king of France, calling the other European sovereigns *koral;* but it has since been given to other princes of Europe.

PÆ'AN (*paian: Gr.*), among the ancients a song of rejoicing in honour of Apollo, chiefly used on occasions of victory and triumph. Such songs were named pæans, because the words *Io Pæan!* which alluded to Apollo's contest with the serpent, frequently occurred in them.——Also, a song to Mars before battle.

PÆ'DOBAPTISTS (*pais*, a child; and *baptizo*, I dip: *Gr.*), those who hold that baptism should be administered to infants—a term applicable to most Christians.

PÆ'ONY (*paiònia: Gr.*), the *Pæonia* of botanists, a genus of plants belonging to the natural family *Ranunculaceæ*, well known for their handsome flowers. The species are chiefly herbaceous, having perennial tuberose roots, and large leaves. The flowers are solitary, and of a crimson, purplish, or sometimes white colour. The ancients attributed many wonderful properties to this plant, but it has long since lost all such reputation.——The tree-pæony, called in China *mou-tan*, is cultivated in that country with great care; and many varieties of it are produced, of all colours.

PA'GANISM, the religion of the heathen world, in which the deity is represented under various forms, and by all kinds of images or idols; it is therefore called idolatry or image worship. The theology of the pagans was of three sorts—fabulous, natural, and political or civil. The *fabulous* treats of the genealogy, worship, and attributes of their deities, who were for the most part the offspring of the imagination of poets, painters, and statuaries. The *natural* theology of the pagans was studied and taught by the philosophers, who rejected the multiplicity of gods introduced by the poets, and brought their ideas to a more rational form. The *political* or civil theology of the pagans was instituted by legislators, statesmen, and politicians, to keep the people in subjection to the civil power. This chiefly related to their temples, altars, sacrifices, and rites of worship. The word *pagan* (*pagus*, a district: *Lat*), was originally applied to the inhabitants of the rural districts, who, on the first propagation of the Christian religion, adhered to the worship of false gods, or who refused to receive Christianity after it had been adopted by the inhabitants of the cities. In the middle ages, this name was given to all who were not Jews or Christians, they only being considered to belong to a true religion; but in more modern times, Mohammedans, who worship the one supreme God of the Jews and Christians, are not called *pagans*.

PAGE, a young person attached to the service of a royal or exalted personage. In ancient Persia it was used for a number of noble youths to attend on the sovereign; but this custom was not adopted by the Greeks or Romans. It was common among the northern nations of Europe, and until a comparatively recent period the position was one of servitude and inferiority. When, however, the young noblemen passed through the degree of page to the honours of knighthood, and the custom of bringing up the sons of noble families as pages at court became prevalent, the condition of a page was altered; and his office was continued after chivalry had disappeared. The pages in the royal household are various, and they have different offices assigned them: as pages of honour, pages of the presence-chamber, pages of the back-stairs, &c.

PAGO'DA (*poutghad*, a house of an idol: *Pers.*), a Hindoo place of worship, containing an idol. It consists of three portions: an apartment surmounted by a dome, resting on columns, and accessible to all; a chamber into which only Brahmins are allowed to enter; and, lastly, a cell containing the statue of the deity, closed by massive gates. The most remarkable pagodas are those of Benares, Siam, Pegu, and particularly that of Juggernaut, in Orissa. In the interior of these buildings, besides altars and images of the gods, there are many curiosities. The statues, which are likewise called *pagodas*, and which are often numerous, are usually rude figures of baked earth, richly gilt, but without any kind of expression.——PAGODA is also the name of a gold and a silver coin, current in different parts of Hindostan, and of a value varying from 8*s.* to 9*s.* sterling.

PA'GODITE, a name given to the mineral of which the Chinese make their statues; it is a kind of *steatite* or *serpentine*.

PAINS AND PEN'ALTIES, BILL OF, in Law, an act of parliament to inflict pains and penalties beyond or contrary to the common law, in the particular cases of great public offenders

PAINT'ING (*peinture*: *Fr*), the art of representing objects in nature, or scenes in human life, with fidelity and expression. Coeval with civilization, it was practised with success by the Greeks and Romans; obscured for many ages, it revived in Italy in the 15th century, producing the Roman, Venetian, and Tuscan schools; afterwards the German, Dutch, Flemish, French, and Spanish schools; and, finally the English school. The painting of the Egyptians, as is evident from the specimens found in their tombs, was very rude; that of the Etruscans, as seen on their vases, was extremely elegant; that of the Greeks, from the praises bestowed on some of their productions by the ancients, must have had considerable merit; and that of the Romans, as evinced by what we find in Pompeii, must have attained a high degree of excellence. The art is distinguished into *historical* painting, *portrait* painting, *landscape* painting, *animal* painting, *marine* painting, &c.; and, as regards the form and the materials, into painting in *oil*, *water colours*, *fresco*, *distemper*, *miniature*, *mosaic*, &c.——Historical painting is the noblest and most comprehensive of all branches of the art; for in that the painter vies with the poet, embodying ideas, and representing them to the spectator. He must have technical skill, a practised eye and hand, and must understand how to group his well-executed parts so as to produce a beautiful composition; and all this is insufficient without a poetic spirit which can form a striking conception of an historical event, or create imaginary scenes of beauty. The following rules of criticism in painting have been laid down:—1. The subject must be well imagined, and, if possible, improved in the painter's hands; he must think well as an historian, poet, philosopher, and more especially as a painter, in making a wise use of all the advantages of his art, and in finding expedients to supply its defects. 2. The expression must be proper to the subject and the characters of the persons; it must be strong, so that the dumb-show may be perfectly and readily understood; every part of the picture must contribute to this end—colours, animals, draperies, and especially the attitudes of the figures. 3. There must be one principal light, and this and all the subordinate ones, with the shadows and reposes, must make one entire and harmonious whole; while the several parts must be well connected and contrasted so as to render the entire as grateful to the eye as a good piece of music to the ear. 4. The drawing must be just; nothing must be out of place or ill-proportioned; and the proportions should vary according to the characters of the persons drawn. 5. The colouring, whether gay or solid, must be natural, and such as delights the eye, in shadows as well as in lights and middle tints; and the colours, whether they are laid on thick, or finely wrought, must appear to have been applied by a light and accurate hand. 6. Nature must be the obvious foundation of the piece; but nature must be raised and improved, not only from what is commonly seen to what is rarely met with, but even yet higher, from a judicious and beautiful idea in the painter's mind.

PAIR'ING, that custom in the House of Commons, by which two members of opposite political opinions agree to absent themselves from divisions of the house during a certain period.

PAL'ACE-COURT, a court erected by Charles I., and made a court of record, for administering justice in disputes between the domestic servants of the crown It was held once a week before the steward of the household and knight-marshal; its jurisdiction extending twelve miles round Whitehall. Malpractises having crept in, it was abolished in 1849

PAL'ADIN, in the romances of the middle ages, a lord, or chieftain. The name originated in that of the *palatini*, or officers of the palace, in the Byzantine court. It was appropriated by the Italian romantic poets to their heroes, the warriors of Charlemagne; and was ultimately given to the knights-errant, who travelled from place to place to exhibit proofs of their valour and gallantry; extolling their own mistresses as unrivalled in beauty, and compelling those who refused to acknowledge the truth of their panegyrics to engage with them in mortal combat. Of this kind the most famous were Amadis of Gaul and the brave Roland or Orlando, the hero of Boiardo's 'Orlando Innamorato,' and Ariosto's 'Orlando Furioso.'

PALÆOG'RAPHY (*palaios*, ancient; and *graphē*, a writing: *Gr.*), a description of ancient writings, inscriptions, characters, &c.

PALÆOL'OGY (*palaios*, ancient; and *logos*, a discourse: *Gr.*), a discourse or treatise on antiquities; or the knowledge of them.

PALÆONTOL'OGY (*palaios*, ancient: *ōn*, a being; and *logos*, a discourse: *Gr.*), that branch of the science of geology which embraces the study of fossil remains, whether of animal or vegetable origin.

PALÆOZO'IC (*palaios*, ancient; *zoe*, life: *Gr.*), a name given to the oldest groups of sedimentary strata, equivalent to the primary period of some geologists. The PERMIAN or Magnesian Limestone, the CARBONIFEROUS, the DEVONIAN or Old Red Sandstone, the SILURIAN, the CAMBRIAN, and the LAURENTIAN groups, belong to the Palæozoic series. In the Cambrian and Laurentian divisions fossils are very scanty, and the lowest members have been much altered by heat, exhibiting what is termed metamorphic action. [See GEOLOGY.]

PALÆS'TRA (*palaistra*, from *palaio*, I wrestle: *Gr.*), in Grecian Antiquity, a public building, where the youth exercise themselves in wrestling, running, playing at quoits, &c. According to some, the *palæstra* consisted of two portions, the one for exercises of the mind, the other for those of the body.

PALANQUIN', or **PALANKEE'N** (*palkee: Hind*), a sort of litter or covered carriage, used in the East Indies, and borne on the shoulders of four porters called *coolies*, eight of whom are attached to it, and who relieve each other. Fresh bearers are obtained at certain stations on the road. Palanquins are usually provided with a bed and cushions, and a curtain, which can be dropped when the occupant is disposed to sleep. The motion is easy, and the travelling, in this way, is safe and rapid.

PAL'ATE (*palatum: Lat.*), in Anatomy, the roof or upper and inner part of the mouth. The glands in this part secrete a mucous fluid, which lubricates the mouth and throat, and facilitates deglutition. The 'hard palate' is formed by the lower portions of the superior maxillary and palatal bones; the 'soft palate' by the extension of membranous and muscular substance, unsupported by bones.

PAL'ATINE (*palatinus*, belonging to the *palatium*, or emperor's court: *Lat.*), an epithet applied originally to persons holding an office or employment in the palace of the sovereign; hence it came to import possessing royal privileges, as in the cases of the counties *palatine* of Lancaster, Chester, and Durham, which have particular jurisdictions.——On the continent, a *palatine*, or *count palatine*, is a person delegated by a prince to hold courts of justice in a province, or one who has a palace and a court of justice in his own house. All the princes of the German empire were originally servants of the Imperial crown. In course of time they acquired independent authority, and secured that authority to their heirs; among these was the count-palatine, or of the palace, in the German language denominated the *pfalzgraf* This officer was a president who decided upon appeals made to the emperor himself from the judgment of provincial courts. All titles, except that of lord, which is now complimentary, and once belonged to territory, were originally official, as are those of judge, general, &c., at this day. When Charlemagne had extended the German empire, he sent persons to govern in the provinces, under the title of dukes—officers, probably, whose duty was partly military, whence their denomination, which is synonymous with that of leaders or generals. Under the dukes, justice was administered in each district of the province by a *comes*, count or earl; and from these courts lay the appeals already mentioned.

PALE (*palus*, a stake: *Lat.*), an instrument of punishment and execution among the ancient Romans, and still so among the Turks. Hence *impaling*, the passing a sharp pale or stake upwards through the body

——PALE, in Heraldry, one of the honourable ordinaries of an escutcheon; it is also the simplest, being bounded by two vertical lines, at equal distances from the sides of the escutcheon, of which it encloses one-third. The *pallet* is half the pale. A coat bisected by a vertical line, with a different field on each side of it, is said to be *party* (that is, divided) *per pale*.

PALEA'CEOUS (*palea*, chaff: *Lat.*), in Botany, an epithet for chaffy, or resembling chaff; as a paleaceous pappus.

PALIL'OGY (*palilogia*: from *palin*, again; and *lego*, I speak: *Gr.*), in Rhetoric, a repetition of a word, or portion of a sentence, for the sake of greater energy: thus, 'The living, the living shall praise thee.' When the last word of a verse or of a paragraph is repeated, the figure is that species of palilogy called *deuterologia*.

PAL'IMPSEST (*palimpsēstos*: from *palin*, again; and *psao*, I wipe away: *Gr.*), a parchment twice prepared for writing. In consequence of the scarcity of materials for writing upon, it was not unusual, particularly in the middle ages, to erase one work that another might be written in its place. The ingenuity of the monks in erasing has been exceeded by that of the moderns in reviving the original writing, and thus recovering some valuable works and fragments which had been considered as lost. Among these is the treatise of Cicero *De Republicâ*, which was found under a commentary of St. Augustine on the Psalms.

PAL'INDROME (*palin*, again; and *dromos*, a course: *Gr.*), in Composition, a verse or line which reads the same backwards and forwards: thus, what is put in the mouth of Satan—*Signa te, signa, temerè me tangis et angis* (cross thyself, cross thyself you touch and torment me in vain); or, *Roma, tibi subito motibus ibit amor* (love shall suddenly turn to thee, Rome, with deep emotion)

PALINGEN'ESY (*palingenesia*, regeneration: from *palin*, again; and *genesis*, birth: *Gr.*), a term used by entomologists to designate the transitions from one state into another, which are observed with insects, and in each of which the insect appears in a totally different form.——Also the doctrine of the destruction and reproduction of worlds and living beings; it had an oriental origin, though it seems to have been that of the stoics. In the New Testament (Tit. iii. 5), it means moral regeneration.

PAL'INODE, or PAL'INODY (*palinōdia*: from *palin*, again; and *ōdē*, a song: *Gr.*), a recantation, particularly a poetical one, of anything dishonourable or false uttered against another person.

PALISA'DES, or PALISA'DOES (*palissade*: *Fr.*; from *palus*, a stake: *Lat.*), in Fortification, an enclosure of stakes, or posts sharpened and set firmly in the ground, used to fortify the avenues of open forts, &c. They are generally nine or ten feet long, and sloped outwards from the work. Sometimes they cannot be seen by the enemy until he reaches them.

PALISSE' (*Fr.*), in Heraldry, a bearing like a range of palisades before a fortification, represented on a fesse, rising up a considerable height, and pointed at the top, with the field appearing between them.

PAL'ISSY WARE, a species of pottery originally made in France about 1555 by Bernard Palissy. The old ware is much prized by collectors, and is distinguished by the high relief of the figures and ornaments. It has been successfully imitated of late years.

PALL, in Heraldry, the *pallium*, or archiepiscopal ornament sent from Rome to the metropolitan bishops.

PAL'LA (*Lat.*), in Antiquity, a long kind of mantle or upper garment worn by the Roman females, part of which was thrown over the left shoulder, and held fast under the arm. Tragic actors also wore the *palla*.

PALLA'DIUM, a Trojan statue of the goddess Pallas, which represented her as sitting with a spear in her right hand, and in her left a distaff or spindle. On this statue the fate of the city was supposed to depend; for while this sacred image was retained, Troy was supposed to be invincible. Hence anything that affords effectual protection and security to our liberties, as the *trial by jury*, is called a palladium. ——PALLADIUM, in Mineralogy, a metal obtained in very small grains, of a steel-grey colour and fibrous structure, found associated with platina or in auriferous sand. When native, it is alloyed with a little platina and iridium. It is ductile and very malleable, superior to wrought iron in hardness; its spec. grav. is 11·8. It is oxidized and dissolved by nitric acid; its fusibility is intermediate between that of gold and platina. On exposure to a strong heat, its surface undergoes a tarnish, and becomes blue.

PAL'LET, among Gilders, a tool for taking up the gold leaf from the cushion, and applying or extending it.——In Heraldry, the diminutive of a *pale*, being one-half of its breadth.——In Horology, the pieces connected with the pendulum or balance, which receive the immediate impulse of the swing wheel or balance-wheel. They are of various forms, according to the kind of *escapement*.——Among Mariners, a partition in a hold.——Among Painters, a small oval tablet of wood or ivory, on which a painter places the several colours he has occasion to use. The middle serves for mixing the colours and making the tints required. It is held by putting the thumb through a hole made at one end of it.——Among Potters, crucible-makers, &c., a wooden instrument for forming and rounding their works

PAL'LIUM (a cloak: *Lat.*), an upper garment or mantle worn by the Greeks, as the *toga* was by the Romans. Each of these was so peculiar to the respective nations, that *Palliatus* is used to signify a Greek, and *Togatus* a Roman. The pallium or pall was also the woollen mantle which the Roman emperors were accustomed, from the 4th century, to send to the patriarchs and primates of the empire, and which was worn as a mark of ecclesiastical dignity.——The ornament sent by the pope to the archbishops of the Roman Catholic church, to the four Latin patriarchs, and sometimes to simple bishops. It consists of a collar, having a narrow flap edged with lead, covered with black silk, falling down before and behind, and decorated with small crosses. It is made of the wool of the ten white lambs blessed at Rome on the festival of St. Agnes. Formerly, archbishops were obliged to visit Rome for the purpose of being invested with it—a custom introduced by Gregory VII., when the papacy was at the height of its power; but now it is sent to them. All the Greek bishops wear the pallium.

PALL MALL, or PALLE MAILLE (*Fr.*), an ancient game, in which an iron ball was struck with a mallet through a ring or arch of iron. It was formerly practised in St. James's Park, and gave its name to the street called Pall-Mall (pronounced (Pell-Mell).

PAL'MATED (*palmatus: Lat.*), shaped like a hand with spreading fingers.

PALM'ER, a pilgrim who returned from the Holy Land, bearing branches of palm; he was distinguished from other pilgrims by his profession of poverty, and living on alms as he travelled.

PALM'ER-WORM, a name given to the larvæ of various species of coleoptera.

PAL'MIPEDES (*Lat:* from *palma*, the palm of the hand; and *pes*, a foot), in Ornithology, a name given by Cuvier to an order of web-footed birds, corresponding to the *Anseres* of Linnæus, and the *Natatores* or swimming birds of Illiger.

PALM'ISTRY (*palma*, the palm of the hand: *Lat.*), a mode of telling fortunes by the lines of the hand; a trick of imposture much practised by gipsies.

PAL'MITIN, the principal constituent of fresh palm-oil. To obtain it, the liquid portions of the oil are separated from it by pressure; the solid part is then boiled with alcohol, to remove by solution any fat acids present; and the residue, which is palmitin, is purified by repeated crystallizations with ether. It is a mass of small crystals, which, when fused and cooled, is a semi-transparent mass that may be rubbed to powder. It is nearly insoluble, except in boiling ether

PALM'-OIL TREE, an African palm, the *Elæis guineensis*, from the kernels of whose fruit is obtained a rich oil, which is brought to this country as a reddish-yellow solid, and is used in the manufacture of soap, candles, &c.

PALM-SUN'DAY, the sixth Sunday in Lent, the next before Easter. The Roman Catholic church has a festival on this day in commemoration of Christ's triumphal entry into Jerusalem, when palm branches were strewn on the way.

PALM'-WINE, a liquor obtained in the East Indies by the incision of a species of the palm. It is called *toddy* before it is fermented.

PALMS (*palma: Lat.*), an order of endogenous trees chiefly inhabiting tropical regions; Linnæus styled them the princes of the vegetable world, and Lindley avers that they are without doubt the most interesting plants in the vegetable kingdom, 'if we consider the majestic aspect of their towering stems crowned by a still more gigantic foliage; the character of grandeur which they impress upon the landscape of the countries they inhabit; their immense value to mankind as affording food and raiment and numerous objects of economical importance; or finally, the prodigious development of those organs by which their race is to be propagated.' With regard to the last point he refers to the 12,000 male flowers of the Date palm, the 600,000 flowers upon a single individual of another, and the fruits borne by every bunch of the Seje palm on the Oronoco. Their flowering parts are arranged in threes, or one of the multiples of that number. The calyx has six divisions; the stamens are six in number; and the fruit consists of a berry or drupe, composed of a substance sometimes hard and scaly, but oftener fleshy, or fibrous, surrounding a one-seeded nut. Though some species grow to a very great height, in others the stem rises only a few inches above the surface of the ground. Among the most useful of the palms may be mentioned the cocoa-nut, the sago, and the date, the last of which occasionally reaches the height of 100 feet, sometimes growing spontaneously, and sometimes cultivated with great care. The *caleu*, or palm-wine of India, is made of its juice. At certain times of the year, they ascend the trees, by means of a strap passed round the back, and a rope round the feet; and bruise the flower-bud, between two pieces of flat stick, to prevent its opening; this is done for three successive mornings; on each of the four following, a thin slice is cut from the top, to prevent the spathe from bursting; and on the eighth morning, a clear sweet liquor begins to flow. This, in its fresh state, is *toddy;* and is a favourite beverage with both natives and Europeans. It soon ferments of itself, and acquires intoxicating properties. *Sago* is obtained from the interior of the trunks of several palms, but particularly from the *Sagus farinifera*. The *Areca Catechu*, called also the betel-nut, is remarkable for its intoxicating power. The rattans of the shops are the flexible stems of a species of the genus *Calamus*. Darwin has described a palm common in Chili which has a large stem thicker at the middle than above or below. In the spring of the year many are cut down, and when the trunk is lying on the ground the crown of leaves is lopped off. The sap immediately flows from the upper end, and continues flowing for several months, it is, however, necessary that a thin slice should be shaved off from that end every morning, so as to expose a fresh surface. A good tree will give 90 gallons, and all this must have been contained in the vessels of the apparently dry trunk. The sap is concentrated by boiling, and is then called treacle, which it much resembles in taste. The handsomest palm of India is the *Caryota urens*, which derives its specific name (burning) from the sensation caused by an application of the rind of its fruit to the skin. Its pith yields an excellent sago, and a great quantity of toddy is obtained from the tree in the hot season. The Ubrissu (*Ma-*

nicaria saccifera), a Brazilian palm, has erect leaves 25 feet long and 6 feet wide, which grow round the summit of a stem only four feet high, and give to the tree the appearance of a shuttle-cock. *Fan Palms* belong to many widely scattered genera, and are so called from the resemblance of their leaves to fans. The only European species of palm, the *Chamærops humilis*, a common plant in the south of Spain and Portugal, has fan leaves. Of another species (*Mauritia flexuosa*), growing in the country of the Amazons, Mr. H. W. Bates thus writes: 'The palms which clothed nearly the entire islet had huge cylindrical smooth stems three feet in diameter and about a hundred feet high. The crowns were formed of enormous clusters of fan-shaped leaves, the stalks alone of which measured seven to ten feet in length. Nothing in the vegetable world could be more imposing than this grove of palms. There was no underwood to obstruct the view of the long perspective of towering columns. The crowns which were densely packed together at an immense height overhead shut out the rays of the sun; and the gloomy solitude beneath, through which the sound of our voices seemed to reverberate, could be compared to nothing so well as a solemn temple.' Another *Chamærops*, a native of Ceylon, Malabar, and the East Indies, attains the height of 60 or 70 feet, with a straight cylindrical trunk, crowned at the summit by a tuft of enormous leaves, which separate near the outer margin into numerous leaflets, and are usually 18 feet long, exclusive of the leaf-stalk, and 14 broad, a single one being sufficient to shelter 15 or 20 men from the rain. When this palm (sometimes called the *talipot-tree*, or the great fan-palm) has reached the age of 35 or 40 years, it flowers; producing a long, conical, scaly spadix rising to the height of 30 feet from the midst of the crown of leaves, and separating into single alternate branches, which, at the base, extend laterally sometimes 20 feet—the whole covered with whitish flowers, and presenting a most beautiful appearance. The fruit, which is very abundant, is globose, about an inch and a half in diameter, and requires 14 months to ripen, after which the tree soon perishes, flowering but once in the whole course of its existence. The Indians use the leaves for umbrellas, tents, and covering for their houses; the pith, after being pounded, is made into a kind of bread, which is of great use in times of scarcity. The *Palmetto* is a fan palm growing in the southern states of America, and attaining the height of forty or fifty feet. The summit of the stem is crowned with a tuft of large palmated leaves, varying in length and breadth from one to five feet, and supported on long foot-stalks, which give it a beautiful and majestic appearance. At their base and in the centre of the stem are three or four ounces of a white, compact, and tender substance, which is eaten with oil and vinegar.——PALM, an ancient measure, taken from the extent of the hand. The *great palm*, or length of the hand, was equal to about eight inches and a half; the *small palm*, or breadth of the hand, to about three inches. The *modern* palm is different in different places.——PALM, the broad triangular part of an anchor at the end of the arms.

PAL'SY, or PARAL'YSIS (*paralusis*, from *paraluo*, I relax: *Gr.*), in Medicine, a nervous disease, known by the loss or defect of the power of voluntary muscular motion in the whole body, or in a particular part. It appears under different forms; and may be a loss of the power of motion without a loss of sensation, or a loss of sensation without loss of motion, or a loss of both. Sometimes it attacks the whole system; at others, it affects one side of the body, when it is called *hemiplegia*; and at others only a single member. It frequently produces a distortion of the mouth, an indistinctness of speech, and an impaired intellect. A paralysis of any of the vital organs is attended with immediate death.

PA'LY, or *paleways*, in Heraldry, is when the shield is divided into four or more equal parts, by perpendicular lines from top to bottom.

PAM'PAS, vast plains in the southern parts of Buenos Ayres, which extend from the foot of the eastern ridge of the Andes to the River Plata, stretching southwards as far as Patagonia. They cannot be called deserts, since they are covered with herbage, and inhabited by vast herds of wild cattle and droves of horses.

PAMPE'ROS, violent winds so called, which come from the west or south-west; and sweeping over the Pampas, often do much injury on the coast.

PANACE'A (*panakeia*: from *pan*, every thing; and *akeomai*, I heal: *Gr.*), a remedy which professes to cure all kinds of diseases.

PANAMA' HATS; these are made of the young leaves of a palm-tree by the natives of the eastern parts of Peru. They are an article of commerce in Brazil, and the cost of the finer qualities varies from 12*s.* to 6*l.*

PANATHENÆ'A (*Panathenaia*: *Gr.*), in Grecian Antiquity, an ancient Athenian festival, in honour of Minerva, who was the protectress of Athens, and called *Athena*. There were two solemnities of this name, one of which was termed the *greater Panathenæa*, and celebrated every fourth year. It was distinguished from the *less*, which was celebrated every year, not only by its greater splendour and longer continuance, but more particularly by the solemn procession in which the *peplus* was carried from the Acropolis into the temple of the goddess. The peplus was a sacred garment with which the ivory statue of Minerva was covered; it was made of white wool, was embroidered with gold, and consecrated by young virgins. This festival was so holy, that criminals were released from the prisons on the occasion of its celebration, and men of distinguished merit were rewarded with gold crowns. The exhibitions at these festivals were races by torchlight, gymnastic exercises, musical and poetical contests, and sacrifices.

PANCRA'TIUM (*pankration*: from *pan*,

all; and *kratos*, power: *Gr.*), among the ancients, a kind of exercise, which consisted of wrestling and boxing. In these contests it was customary for the weaker party, when he found himself pressed by his adversary, to fall down, and fight rolling on the ground. In Botany, a genus of bulbous rooted plants with handsome flowers, nat. order *Amaryllidaceæ*.

PAN'CREAS (*pan*, all; and *kreas*, flesh: *Gr.*), in Anatomy, a flat glandular viscus of the abdomen; in animals it is called the *sweetbread*. It secretes a fluid resembling saliva, and pours it into the duodenum, to dilute the bile and render it more miscible with the food.

PAN'DECTS (*pandektai:* from *pan*, all; and *dektês*, a receiver: *Gr.*), the name of a volume of the civil law, digested by order of the emperor Justinian.

PANEGYR'IC (*panêgurikos*, fit for a public assembly: *Gr.*), in Oratory, an harangue or eulogy, written or spoken in praise of an individual or a body of men. Panegyrics were much used by the ancients; and in modern times they are delivered in France, where they are termed *eloges*, in certain literary and scientific institutes, on the decease of one of the members.

PAN'EL, in Law, a schedule or roll of parchment on which are written the names of the jurors returned by the sheriff. *Impanelling* a jury is returning their names in such schedule. In Scotland, the accused person in a criminal action, from the time of his appearance, is termed 'the panel.' ——PANEL, in Joinery, a square of thin wood, framed or grooved in a large piece between two upright pieces and two cross pieces; as the *panel* of a door.

PAN'IC (*panique: Fr.;* from *panikos*, groundless fear—literally belonging to Pan: *Gr.*), an ill-grounded terror inspired by the misapprehension of danger. The word is said to be derived from Pan, the name of one of the captains of Bacchus, who with a few men routed a numerous army, by a noise which his soldiers raised in a rocky valley, and which was augmented by a great number of echoes. Hence all ill-grounded fears have been called *panic* fears.

PAN'ICLE (*panicula*, the *dim.* of *panus*, a thread wound on a bobbin: *Lat.*), in Botany a sort of inflorescence, in which the primary axis developes secondary ones, and the secondary tertiary. It is therefore a branching raceme.

PAN'ICUM (*Lat.*, from *panis*, bread), in Botany, a genus of plants, nat. ord. *Graminaceæ*. The species are annuals and consist of various kinds of *panic-grass*.

PAN'NAGE (*Fr.*), in Law the feeding of swine upon *mast* in woods; also the money paid for the license to have pannage.

PANNIC'ULUS CARNO'SUS (a fleshy tunic: *Lat.*), in Comparative Anatomy, a strong fleshy substance, situated in beasts between the hide and the fat, by means of which they can move their skin in whole or in part; it is altogether wanting in the human frame.

PANORA'MA (*pan*, everything; and *orama*, a sight: *Gr.*), a picture on a very large scale, fixed around a room specially constructed for the purpose, so that from the centre a spectator may have a complete view of the objects represented. The artist must take an accurate plan of the whole surrounding country, as far as the eye can reach from a high point. Truth of representation and closeness of imitation are the great objects to be aimed at in panoramas, and the deception must be promoted by the manner in which the light is admitted. When it is well executed, the panorama produces a complete illusion. The *diorama* differs from it chiefly in being flat instead of circular, and therefore, like any other painting, presenting only a particular view, in front of, instead of all round, the spectator [See DIORAMA.]

PANSTEREORA'MA (*pan*, all; *stereos*, solid; and *orama*, a sight: *Gr.*), the model of a town or country in cork, wood, pasteboard, &c.

PAN'SY (*pensée*, a thought: *Fr.*), the garden varieties of the *Viola tricolor*, and other flowers usually termed *heartsease*.

PANTALOON' (*pianto leone*, 'I plant the lion,' the old Venetian war-cry: *Ital.*), one of the chief characters in a pantomime. His dress originally included the article known by his name. The pantaloon was introduced by the Venetians, and, with them, was a *burgher*. The name is an allusion to the boastful language indulged in by the Venetians regarding themselves.

PANTECH'NICON (*pan*, all; and *technikos*, belonging to art: *Gr.*), a repository or warehouse where every kind of manufactured article is exposed for sale.

PAN'THEISM (*pan*, every; and *Theos*, God: *Gr.*), the belief that the universe is not distinct from God; in other words, that it is both *natura naturans* and *natura naturata*.

PANTHE'ON (*pantheion*, literally common to all the gods; from last), in Roman Antiquity a temple of a circular form, dedicated to all the heathen deities. It was built on the *Campus Martius*, by Agrippa, son-in law to Augustus, and is now a church dedicated to the Virgin Mary and all the martyrs. It is called the *rotunda*, on account of its form, and is one of the finest edifices in Rome. Its hemispherical dome is 142 feet in diameter, and 144 feet in extreme height from the pavement; it has an opening in the centre, by which alone the building is lighted—the rain which falls through being conveyed away by a sewer under the marble pavement. The well-preserved portico of this edifice seems to be of a later period than the temple itself; it consists of sixteen columns of oriental granite, each of which is 15 feet in circumference. The interior was formerly adorned with vast quantities of bronze, and with the most beautiful statues of the various deities, but they were removed by Constantine to Constantinople; at present there are, in the eight niches, eight fine columns, placed there by the emperor Adrian. It is very remarkable, and shows the alteration which has taken place at Rome, that the entrance is now twelve steps below, though formerly it was twelve steps above, the surface of the ground.

PAN'THER (*panthēr:* *Gr.*), in Zoology, the *Felis Pardus*, a ferocious quadruped, of the size of a large dog, with short hair, of a yellowish colour, diversified with roundish black spots. It is a native of Africa, and has the general habits of the leopard, from which it is only to be distinguished by the larger spots which usually form rings. Naturalists now believe that both belong to the same species, *Leopardus varius*.

PAN'TOGRAPH (*pan*, all; *grapho*, I write, *Gr.*), an instrument by which drawings may be copied on a reduced or on an enlarged scale

PANTOM'ETER (*pas*, all; and *metreo*, I measure: *Gr.*), an instrument used to take all sorts of angles, distances, and elevations.

PAN'TOMIME (*pas*, all; and *mimos*, an imitator: *Gr.*), a theatrical representation consisting entirely of gestures and actions, assisted by scenery and machinery. Formerly, Harlequin, Columbine, Pantaloon, and the Clown were sufficient, but now a-days something much more elaborate is placed on the stage.——PANTOMIMES, among the ancients, were persons who could imitate all kinds of actions and characters by signs and gestures Scaliger supposes they were first introduced upon the stage to succeed the chorus and divert the audience with apish postures and antic dances. In after times their interludes became distinct entertainments, and were separately exhibited.

PA'PACY, the office of pope, or the succession of popes. The word *papa* is used in the eastern church to signify any priest; in the west it was not, at first, applied exclusively to the bishop of Rome. The earliest appearance of substantial power in the papacy is discovered in the 4th century, when Theodosius gave to the patriarch of Constantinople the *second* rank. The authority of the Roman bishop was augmented first by his see being the capital of the world, and then by the very removal of the seat of empire from it, which left him to a certain extent independent of the imperial sway. The donations, by Pepin and Charlemagne, of the territories which constitute what is called the patrimony of St. Peter, gave to the popes the position of temporal sovereigns; and they availed themselves of every opportunity of extending their dominions. But it was in the pontificate of Gregory VII. that the temporal power of the papacy received its complete development. This ambitious pontiff sought to reduce all Christendom into feudal subjection to the holy see, and claimed the prerogative of appointing the various sovereigns of Europe. This authority, though generally disputed by the emperors and other potentates, was more than once reluctantly admitted by them. The degradation to which John of England submitted is a proof of the power which the popes had succeeded in acquiring, and of the humiliations to which kings were sometimes obliged to submit. The reformation, however, in depriving the papacy of one-third of its subjects, caused a gradual decline of authority, so that in modern times it has had but little political influence.

PAPAW', the *Carica Papaya*, a tree growing in warm climates to the height of 18 or 20 feet, with a soft stem, naked nearly to the top, where there is a crown of large lobed leaves on long foot stalks; it bears a large pear-shaped succulent fruit, of little value, but its acrid milky juice is said to possess the singular property of making tough meat tender in a very short time Nat order *Papayaceæ*

PA'PER (*papier: Fr.;* from *papyrus*. *Lat*), the well known substance on which letters and figures are written or printed The ancients were obliged to have recourse to a variety of substitutes for our paper—stone, wood, lead, skins, &c, but chiefly to *papyrus* The latter was manufactured in Egypt, with great success, up to the 5th century, when its use began to decline in Europe, and it was gradually superseded by parchment and by paper, which was made from cotton at least as early as the 10th century. The Chinese and Persians were acquainted very early with the mode of manufacturing paper. It must formerly have been made by a different process from that now employed, since, in the old specimens, there are no marks of the wires through which the water is drained at present. Various materials have been latterly employed besides linen and cotton, and with great success—among others, straw; in fact, any substance will answer if it contains woody fibre, which is indispensable to a serviceable paper. The substance used is first reduced to a pulp, the quality of which is of the greatest importance; size is mixed with the pulp, except in the manufacture of writing paper, to which it is generally added when in sheets. The pulp is poured in moulds having wire bottoms, through which the fluid passes off; the marks caused by these wires are called 'water marks,' but they are now avoided in *wove paper* by the use of a wire cloth. The paper is transferred from the mould to a *felt* or woollen cloth, and when the quantity has reached a *post* or six quires, it is subjected to great pressure; this removes a large amount of the remaining moisture, after which it is placed in the drying rooms; and when dry it is, if not sized before, dipped in a mixture of size and alum. After being dried, sorted, and pressed, it is made up into quires. Paper is distinguished, as to its use, into writing paper, drawing paper, cartridge paper, copy, chancery, &c.; as to its size, into foolscap, post, crown, demy, medium, royal, imperial, &c. Some of these terms, thus *foolscap*, are due to the water marks formerly used by manufacturers as a means of distinguishing their paper from that of others. Water marks prevent frauds with regard to bank notes, &c.; and they have sometimes, in courts of law, been the means of detecting forgeries of documents pretended to be of an earlier date than what was evinced by the water mark in the paper. Paper is made either by hand or by machinery; and perhaps none of the useful arts have received more attention in order to bring them to perfection than the paper manufacture. In whiteness, fineness, and firmness, the paper made in England excels all others; the French manufacture some of a very fine quality; the Italians and Germans are noted more for the durability of their paper than for its fineness. The demand for paper is so enormous that recourse is had, of necessity, to machinery, which is of a most ingenious description. France claims, and perhaps with justice, the honour of its first invention; but almost every good automatic paper mechanism at present mounted in France, Germany, Belgium, Italy, Russia, Sweden, and the United States, has either been made in Great Britain, and exported to those countries, or has been constructed in them upon the English models. Many and various have been the improvements introduced, till at length the art has so completely triumphed over every difficulty that a continuous stream of fluid pulp is now passed round the cylinders with unerring precision, and not only made into paper, but actually dried, pressed smooth, and every separate sheet cut round the edges, in the brief space of a very few minutes.

PA'PER-MONEY, or PA'PER CUR'RENCY, bank notes or bills issued on the credit of government, and circulated as the representative of coin. In a more extensive sense, these terms may denote all kinds of notes and bills of exchange.

PA'PER-MUL'BERRY, a Japanese tree, hardy enough to grow in the open air in England. It is the *Broussonetia papyrifera* of botanists, nat. ord. *Moraceæ*. The inner bark of the young shoots is separated by maceration in water, and after having been beaten into a pulp, some of this is spread in sufficient quantity over a small tray with a slightly raised rim. Thus a sheet of paper is prepared by the Japanese, which is made ready for use by being dried in the sun.

PA'PIER LINGE (linen paper: *Fr.*), a kind of paper made to resemble damask and other linen so ingeniously, that it is impossible, without careful examination, to detect the difference. Even to the touch, articles made from the *papier linge* are very much like linen; and they can be used for every purpose to which linen is applicable, with the exception, of course, of those in which strength and durability are required, and of those in which it is necessary to subject the material to the action of water or moisture.

PA'PIER MA'CHÉ (chewed paper: *Fr.*), the composition of which superior tea-trays, snuff-boxes, and many other light and elegant articles, as well as a variety of toys, &c., are manufactured. It is made of cuttings of white or brown paper, boiled in water, and beaten until they are reduced to a pulp, and then boiled in a solution of gum-arabic, or of size, to give consistency to the pulp, which is afterwards formed into different shapes, by pressing it into oiled moulds. When dry, it is coated with a mixture of size and lamp-black, and afterwards varnished. Another article, sometimes known by this name, consists of sheets of paper glued and powerfully pressed together, so as, when dry, to possess the hardness of board, and yet, while moist, to be capable of being forced into almost any shape. Tea-trays, snuff-boxes, &c., are manufactured from it; and, after being varnished, are often exquisitely ornamented with figures, landscapes, gilding, &c. *Papier mâché* is rendered, to a great extent, waterproof by mixing sulphate of iron, lime, glue, or white of egg, with the pulp; and almost fire-proof, by borax and phosphate of soda.

PAPIL'IO (*Lat.*), in Entomology, a genus of butterflies of which there is only one representative in this country, the swallow-tailed butterfly, the *Papilio Machaon*. It is coloured yellow and black, and makes its appearance in May and June. The caterpillar feeds on fennel and carrot, and is of a green colour with black cross bands.

PAPILIONA'CEOUS (same *deriv.*), in Botany, an epithet for the corolla of plants which bear some resemblance in shape to a butterfly; such as that of the pea. The papilionaceous corolla is usually five-petalled, having an upper spreading petal called the *banner* or *standard*, two side petals called *wings* or *alæ*, and two lower petals frequently united and forming the *keel* or *carina*.

PAPIL'LÆ (*Lat.*), the nipples of the breast. Also, the terminations of the nerves in that form which constitutes the sense of feeling in the true skin, and of taste. They are prominent on the palmar surface of the fingers and plantar surface of the toes, where they are arranged along curved lines, in double rows. Also, any small nipple-like prominences.

PAPIL'LOSE (*papilla*, the nipple: *Lat.*), in Botany, covered with fleshy dots or points, or with soft tubercles.

PA'PIST (*papa*, the pope: *Lat.*), one that adheres to the doctrines and ceremonies of the church of Rome; a Roman Catholic.

PAPPOOS', the name given to a young child by the natives of New England.

PAP'PUS (*Lat.; from pappos, Gr.*), in Botany, a sort of feathery or hairy crown with which many seeds, especially those of composite plants, are furnished, and which aids in their dissemination. Structually the pappus is the limb of the calyx, elongate and divided.

PAP'ULOSE (*papula*, a pimple: *Lat*), in Botany, an epithet for a leaf, &c., covered with vesicular points or with small blisters.

PAPYROG'RAPHY (*papuros*, papyrus; and *graphē*, a writing: *Gr.*), a lately-invented art, which consists in taking impressions from a kind of pasteboard covered with a calcareous substance (called lithographic paper), in the same manner as from stones in the process of lithography.

PAPY'RUS (*Lat.; from papuros: Gr.*), a sedge-like plant, the *Papyrus antiquorum* of botanists (nat. ord. *Cyperaceæ*), famous for having furnished the ancients with a material for writing upon. In former times it grew abundantly in the marshy ground of the Nile Delta, where it is now almost extinct, and also near Syracuse, where it is still plentiful. Its roots are tortuous, and in thickness about four or five inches; its stem, which is triangular and tapering, rises to the height of ten feet, and is terminated by a number of wide spreading towering spikes, surrounded with an involucre composed of eight large sword-shaped leaves. Other species of cyperaceous plants, called by the general name of *Papyrus*, were, and are, used extensively in Egypt for other purposes. The inhabitants of the countries where they grow, even to this day, manufacture them into sail-cloth, cordage, and sometimes wearing apparel. Boats are made by weaving the stems compactly together, and covering them externally with a resinous substance, to prevent the admission of water. The papyrus was prepared for use by cutting the interior of the stalks, after the rind had been removed, into thin slices in the direction of their length; laying these, in succession, on a flat board; placing similar slices over them, at right angles; cementing their surfaces together by a glue, subjecting them to pressure, and drying. The size of the sheet was variable in length, to any desired extent. This material, in pliability, durability, and cheapness, exceeded every other employed by the ancients as we employ paper, the skins of the Ionians, the linen of the Romans, the cotton stuff and palm-leaves of the Indians, and the parchment of Mysia. Many of the papyri still existing exhibit a great difference in texture; they are fragile, and difficult to unrol till exposed to steam or the damp of a moist climate. They are chiefly found in Egypt and Herculaneum. But as yet no work of any value has been discovered in them, though their deciphering has cost much trouble and ingenuity. Papyrus was in general use until the end of the 7th century, after which it was gradually superseded by parchment and paper. We possess papyri written more than 2000 years before the Christian era.

PAR (equal: *Lat.*), in Commerce, a term applied to any two things equal in value. In money matters, it indicates the equality of one kind of money or property with another. Thus, when 100*l.* stock is worth exactly 100*l.* specie, the stock is said to be *at par;* that is, the purchaser is required to give neither more nor less of the commodity with which he parts, than the nominal equivalent of that which he acquires. Thus, too, the *par* of exchange is the value of money in one place equal to a given sum in another. In the exchange of money with foreign countries, the person to whom a bill is payable is supposed to receive exactly the same amount as was paid to the drawer by the remitter; but this is not always the case with respect to the intrinsic value of the coins of different countries, which is owing to the fluctuation in the rates of exchange among the several countries and great trading cities. In fine, bills of exchange, stocks, &c., are *at par* when they sell for their nominal value; *above par* when they sell for more; and *below par* when they sell for less.

PA'RA, a Turkish coin, very small and thin. It is of copper and silver, and is the fortieth part of a Turkish *piaster*. It is worth rather less than a halfpenny.

PAR'ABLE (*parabolē*, from *paraballo*, I set side by side—that is, compare: *Gr.*), a fable or allegorical representation of something real or apparent in life or nature, from which a moral is drawn for instruction.

PARAB'OLA (same, because its axis is parallel to the side of the cone), in Conic Sections, a curve produced by cutting a cone by a plane parallel to one of its sides. The peculiar property of the *Apollonian* parabola is, that each point in it is at the same distance from its *focus* as from a line termed the *linea directrix*, which perpendicularly intersects the axis—a line passing through the focus. There are other kinds of curve which are termed parabolas. Theoretically, projectiles describe the Apollonian parabola.

PARABOL'IC AS'YMPTOTE, a parabolic line approaching to a curve, so that they never meet; yet, by producing both indefinitely, their distance from each other becomes less than any given line.

PARABOL'IC CO'NOID, a solid generated by the revolution of a parabola about its *axis*. Its contents are equal to half those of a circumscribed cylinder, and once and a half those of a cone having the same base and altitude.

PARABOL'IC SPIN'DLE, a solid formed by the revolution of a parabola about its *base*, or double ordinate.

PARABOL'IFORM, having the form of a parabola.

PARAB'OLISM (*paraballo*, I compare one thing with another: *Gr.*), in Algebra, the division of the terms of an equation by a known quantity that is involved or multiplied in the first term.

PARAB'OLOID (*parabolē*, a parabola; and *eidos*, form: *Gr.*), in Geometry, a parabola of a higher order.——Also, another term for the *parabolic conoid*.

PARACEL'SIANS, the followers of Paracelsus, who, it is probable, was the most celebrated quack that ever existed. His system of medicine successfully opposed those of Hippocrates and Aristotle. He mingled cabalistic speculations and his peculiar notions of theology with medical and chemical knowledge. He died in 1541, but his followers exercised considerable influence over medicine, physics, and mystical science in Germany, for more than a century after.

PARACEN'TRIC MO'TION (*para*, alongside of; and *kentron*, the centre: *Gr.*), in Astronomy, denotes the rate at which a planet approaches nearer to, or recedes from, the sun or centre of attraction.

PARACH'RONISM (*para*, past; and *chronos*, time: *Gr.*), an error in Chronology, by which an event is related as having happened at a later period than its true date.

PAR'ACHUTE (*para*, against: *Gr.;* and *chute*, a fall: *Fr.*), in Aerostation, a machine in the form of a large umbrella, intended to enable a person to descend from a balloon. While attached to the lower end of the balloon, it is closed, but it expands itself immediately when beginning to descend, on being liberated from that machine. Its violent oscillations greatly endanger the safety of the aeronaut; and it was supposed that these might be prevented by using a parachute in the form of an *inverted* umbrella, with an aperture in the centre; but when the experiment was tried, the hoop broke, the parachute collapsed, and the unfortunate experimentalist was killed.

PAR'ACLETE (*paraklētos*, from *parakaleo*, I call to aid: *Gr.*), the *Comforter*, a term applied in the sacred volume to the Holy Spirit. In the early times of the church, the opinion was not uncommon, that Christ was to send the promised Paraclete corporeally; and hence several impostors, Simon Magus, Manes, Montanus, and others, pretended to be this expected Comforter.

PARACROS'TIC (*para*, alongside of; *akros*, the outermost; and *stichos*, a line: *Gr.*), a poetical composition in which it is necessary that the first verse should contain in order all the letters with which the succeeding verses commence.

PAR'ADIGM (*paradeigma*, from *paradeiknumi*, I hold up to view: *Gr.*), in Grammar, an example of a verb conjugated in the several moods, tenses, and persons.

PAR'ADISE (*paradeisos: Gr.; from pardēs: Heb.*), a region of supreme felicity; generally meaning the garden of Eden.——When Christians use the word, they mean that celestial paradise, or place of pure and refined delight, in which the souls of the blessed enjoy everlasting happiness.

PAR'ADISE, BIRDS OF, a tribe of birds belonging to the conirostral group of the *Passeres*, the same group to which the crows and finches belong. They exclusively inhabit the island of New Guinea, and some adjacent islets. About thirteen species are known, all remarkable for the great beauty of the plumage. It was at one time generally believed that they had no legs (the people who sold their skins to the traders always removing the legs), that they spent their lives on the wing, feeding upon dew, and that the females laid their eggs in a cavity on the backs of the males, where they were hatched. Even now such is the rarity of some species, and the inaccessibility of the places where all reside, that little is known of their habits. Specimens of one or two species have been brought alive to England, but they are becoming every day more rare in their native woods. That persevering traveller and naturalist, Mr. Wallace, made five voyages to different parts of the district they inhabit, each occupying in its preparation and execution the larger part of a year, and yet he only obtained specimens of five species. Nature seems, he says, to have taken every precaution that these her choicest treasures may not lose value by being too easily obtained. First we find an open, harbourless, inhospitable coast, exposed to the full swell of the Pacific Ocean; next a rugged and mountainous country covered with dense forests, offering in its swamps and precipices and serrated ridges an almost impassable barrier to the central regions; and lastly a race of the most savage and ruthless character, in the very lowest stage of civilization. In such a country, and among such a people, are found these wonderful productions of nature. In those trackless wilds do they display that exquisite beauty and that marvellous development of plumage calculated to excite admiration and astonishment among the most civilized and most intellectual races of men. A feather is itself a wonderful and beautiful thing. A bird clothed with feathers is almost necessarily a beautiful creature. How much, then, must we wonder at and admire the modification of simple feathers into the rigid polished wavy ribbons which adorn one species, the mass of airy plumes on another, the tufts and wires of a third, or the golden buds borne upon airy stems that spring from the tail of a fourth; while gems and polished metals can alone compare with the tints that adorn the breast of two others, and the immensely developed shoulder plumes of a seventh.

PAR'ADOX (*paradoxos*, contrary to opinion: *Gr.*), in Philosophy, a tenet or proposition seemingly absurd, or contrary to received opinion, yet true in fact.

PAR'AFFINE (*parum*, little; and *affinis*, connected with: *Lat.*—on account of its weak affinities), in Chemistry, one of the products obtained by the destructive distillation of coal, petroleum, &c. It is a soft white substance without taste or smell, composed of carbon and hydrogen. It has a specific gravity of about ·87, and its melting point is about 112°, is not decomposed by distillation, burns with a clear white flame without smoke or residuum, and does not stain paper. It dissolves easily in warm fat oils; also in cold essential oils, and in ether, but it resists the action of chlorine, strong acids, and caustic alkalis. This substance is manufactured into candles. Paraffine oil is the rectified product of the distillation of bituminous coal at a low temperature. It is very fluid, has a pale yellow colour, and is lighter than water. It has come into extensive use for illuminating purposes. Solid paraffine can be obtained from it by the application of cold and pressure.

PARAGO'GE (*paragōgē*, from *parago*, I move beside: *Gr.*), a figure in Grammar, by which the addition of a letter or syllable is made to the end of a word. It is used in forming the diminutives of most languages.

PAR'AGON (*para*, past; and *agōn*, a contest: *Gr.*), a model by way of distinction, implying superior excellence or perfection; as, a *paragon* of beauty or eloquence.

PAR'AGRAM (*paragramma*, from *paragrapho*, I compare by writing alongside of: *Gr.*), a play upon words. Hence *paragrammatist*, an appellation for a punster.

PAR'AGRAPH (*paragraphē*, a thing written beside: *Gr.*—on account of the mark used in referring to a paragraph), any section or portion of a writing which relates to a particular point, whether consisting of one sentence or many. Paragraphs are generally distinguished by a break in the lines; when a large quantity of matter is intended to be compressed into a small space, they may be separated by a dash, thus ——. A paragraph is also sometimes marked by a ¶.

PARALEIPOM'ENA (things to be omitted: *Gr.*), in matters of Literature, denotes a supplement of things omitted in a preceding edition of any work. The two books of the Old Testament, called by us, after St. Jerome, the Chronicles, are also termed Paraleipomena.

PARALEIP'SIS (*paraleipsis*, a passing over: *Gr.*), a figure in Rhetoric, by which the speaker pretends to pass by what at the same time he really mentions.

PAR'ALLAX (*parallaxis*, from *paralasso*, I go aside: *Gr.*), in Astronomy, a change of place or aspect.——DIURNAL PARALLAX, the difference between the places of any celestial objects as seen from the surface and from the centre of the earth at the same instant.——ANNUAL PARALLAX, a change in the apparent place of a heavenly body, caused by its being viewed from the earth in different parts of its orbit. The annual parallax of the planets is considerable, but that of the fixed stars has, till very recently, been considered as altogether imperceptible. The latter has, however, been detected in a few instances by the distance between two stars being found to vary at different periods of the year. When the parallax of a celestial body is determined, its distance can be ascertained. The distance of the star known to astronomers as *a centauri*, having a parallax of about one second, has been calculated at twenty billions of miles, through which its light will travel to us in 3¼ years. Diurnal parallax increases the zenith distance of a celestial body, by depressing it in the vertical circle. If it is on the meridian, only its declination is affected; if not on the meridian, both declination and right ascension are altered.——PARALLAX, in Levelling, denotes the angle contained between the line of the true and that of the apparent level.

PAR'ALLEL (*parallēlos*, from *para*, beside, and *allēlois*, one another: *Gr.*), in Geometry, an appellation given to lines and planes everywhere equidistant from each other.——The word *parallel* is also often used metaphorically to denote the continued comparison of two objects, particularly in history. Thus, we speak of drawing an historical *parallel* between ages, countries, or men.——PARALLEL OF ALTITUDE, in Geography, a small circle of the sphere parallel to the horizon: called also an *almacantar*.——PARALLEL CIRCLES, or *circles of latitude*, are small circles of the sphere, conceived to be drawn through all the points of the meridian, commencing from the equator, to which they are *parallel* and terminating with the poles. They are called parallels of latitude, because all places lying under the same parallel have the same latitude.——PARALLEL OF DECLINATION, in Astronomy, a small circle of the celestial sphere parallel to the equator.——PARALLEL LINES, in sieges, are those trenches which generally run parallel with the outlines of the fortress. They serve as places for concentrating the forces to be directed against the fortress, and are usually three feet deep, from nine to twelve feet wide, and of a length adapted to the circumstances of the case.——PARALLEL MOTION, a name given to various contrivances consisting of jointed combinations of linkwork, for guiding parts of machines that have a back and forward motion, such as the piston-rod of a steam-engine, with a view to get rid of the friction attending straight guides. One of the contrivances that have given celebrity to the name of James Watt was a parallel motion, which however was only approximate, not exact.—PARALLEL PASSAGES are such passages in a book as agree in import; as, for instance, certain passages in the Bible.——PARALLEL PLANES are such planes as have all the perpendiculars drawn betwixt them equal to each other.——PARALLEL RAYS, in Optics, are those which keep at an equal distance while passing from the visible object to the eye, which is supposed to be infinitely remote from the object.——PARALLEL RULER, a mathematical instrument, consisting of two equal rulers, so connected together by cross-bars and moveable joints that parallel lines may thereby be drawn at any required distance from each other, within the limits through which they can be opened.——PARALLEL SAILING, in Navigation, the sailing on or under a parallel of latitude, or parallel to the equator.——PARALLEL SPHERE, in Astronomy, the situation of the sphere when the equator coincides with the horizon, and the poles with the zenith and nadir. The sphere would have this appearance to a spectator placed at the poles; to him the stars would neither rise nor set, but would move constantly in circles parallel to the horizon, and the sun would rise and set only once a year.

PAR'ALLELISM (*parallēlismo*, a comparing of parallels: *Gr.*) OF THE EARTH'S AXIS, in Astronomy, the situation of the earth's axis in its progress through its orbit. It is such, that if this axis is parallel to a given line in any one position, it will be parallel to the same line in any other position. This parallelism is the result of the earth's double motion, viz. round the sun and round its own axis, or of its annual and diurnal motion; and we owe to it the vicissitudes of seasons and the inequality of day and night.

PARALLEL'OGRAM (*parallēlogrammos*, from *parallēlos*, parallel; and *grammē*, a line: *Gr.*), in Geometry, a plane figure bounded by four right lines, of which each opposite pair are parallel and equal to one another.——In common use, this word is applied to quadrilateral figures of a greater length than breadth.

PARALLELOPI'PED (*parallelopipède*: *Fr.*; from *parallēlos*, parallel: *Gr.*), in Geometry, a regular solid comprehended within six parallelograms, the opposite ones of which are similar, parallel, and equal to each other; or it is a prism whose base is a parallelogram.

PARAL'OGISM (*paralogismos*, from *paralogizomai*, I reckon wrong: *Gr.*), in Logic and Rhetoric, a reasoning false in point of form—that is, in which a conclusion is drawn from premises which do not logically warrant it. It is the opposite to a *syllogism*.

PARAL'YSIS (*paralusis*, from *paraluo*, I relax: *Gr.*) [See PALSY.]

PARAMAGNET'IC (*para*, beside: *Gr.*), an epithet applied to those bodies which when placed between the poles of a magnet tend to pass bodily from weaker to stronger lines of force, and if the bodies are elongated they set along the lines of force, whilst those that are diamagnetic set across them.

PARAM'ETER (*parametreo*, I measure with: *Gr.*), in Conic Sections, a constant line, otherwise called the *latus rectum*. In the parabola, it is a third proportional to the abscisa and its corresponding ordinate. In the ellipse and hyperbola, the parameter of a diameter is a third proportional to that diameter and its conjugate.——The term also denotes the constant quantity which enters into the equation of a curve.

PAR'AMOUNT (*Fr.*), in Law, the supreme lord of the fee. Lords of those manors that have other manors under them are styled lords-paramount; and the king, who in law, is chief lord of all the lands in England, is thus *the* lord-paramount.

PAR'ANYMPH (*paranumphos*, from *para*, beside; and *numphē*, the bride: *Gr.*), among the ancients, the person who waited on the bridegroom and directed the nuptial solemnities. As the *paranymph* officiated only on the part of the bridegroom, a woman called *pronuba* officiated on the part of the bride.——In Poetry, the term *paranymph* is still occasionally used for the *brideman*.

PAR'APEGM (*parapēgma*, from *parapēgnumi*, I fix beside: *Gr.*), in Classic Antiquity, signified a brazen tablet fixed to a pillar, on which laws and proclamations were engraved. Also, a tablet set in a public place, containing an account of the rising and setting of the stars, eclipses, seasons, &c.

PAR'APET (*parapetto*, a breastwork: *Ital.*), in Fortification, a wall, rampart, or elevation of earth, for screening soldiers from an enemy's shot. It means, literally, a wall breast high.

PAR'APH (*para*, alongside of; and *apto*, I touch: *Gr.*), in Diplomatics, the flourish of a pen at the conclusion of a signature. In the middle ages, it formed a rude provision against forgery, somewhat like the flourishes, &c., engraved on the bank-note. The paraph is still usual in Spain.

PARAPHERNA'LIA (*para*, beside; and *phernē*, a dower: *Gr.*), in Law, the goods which a wife brings with her at her marriage, or which she possesses beyond her dower or jointure, and which remain at her disposal after her husband's death. They consist principally of apparel, jewels, and personal ornaments suited to her degree. Nor can the husband bequeath such, though, during his life, he has power to dispose of them.

PAR'APHRASE (*paraphrasis*, from *paraphrazo*, I say the same thing in other words: *Gr.*), an explanation of some text or passage in an author, in terms more clear and ample than in the original. He who performs this is termed a *paraphrast*. A free translation is sometimes, though improperly, termed a *paraphrase*.

PARAPHRENI'TIS (*Gr.*: from *para*, beside; and *phrēn*, the midriff: *Gr.*), in Medicine, an inflammation of the *diaphragm*.

PARAPHROS'YNE (*paraphrosunē*, from *paraphrōn*, wandering from reason: *Gr.*), a term used by medical writers to express a temporary delirium or alienation of mind in fevers, or from whatever cause.

PARAPLE'GIA (a stroke on one side: *Gr.*), in Medicine, the loss of sensation and voluntary motion in the lower part of the body, in consequence of destructive disease in or injury to a part of the spinal cord.

PAR'ASANG (*parasangēs*: *Gr.*; from *pharsang*: *Pers.*), a Persian measure of length, varying in different ages and in different places, from thirty to fifty stadia or furlongs.

PARASCE'NIUM (*paraskēnia*, from *para*, beside; and *skēnē*, a scene: *Gr.*), in the Grecian and Roman theatres, the side entrances to the stage; the side scenes.

PARASCE'VE (*paraskeuē*, a getting ready: *Gr.*), a word signifying *preparation*, applied to the sixth day of the Jewish week, or Friday, because, not being allowed to prepare their food on the sabbath-day, they provided and prepared it on the day previous. It is used to express *Good Friday*, because that day was the *parasceve* of the passover.

PARASELE'NE (*para*, beside; and *selēnē*, the moon: *Gr.*), a *mock-moon* or phenomenon in the form of a luminous ring encompassing or adjacent to the moon. Sometimes it consists of one, two, or more bright spots, bearing considerable resemblance to the moon. The paraselenes are formed after the same manner as the *parhelia*, or mock-suns.

PAR'ASITES (*parasitos*, from *parasiteo*, I eat with: *Gr.*), among the Greeks, were an order of priests, or at least ministers of the gods, resembling the *Epulones* at Rome. Their business was to collect and take care of the sacred corn destined for the service of the temples and the gods; to see that sacrifices were duly performed, and that no one withheld the first fruits, &c., from the deities. In every village of the Athenians, certain *Parasiti* in honour of Hercules, were maintained at the public charge; but to ease the commonwealth of this burden, the magistrates at last obliged some of the richer citizens to take them to their own tables, and entertain them at their individual expense; hence the word *parasite*, used by the ancients in a sense very similar to that in which it is understood by ourselves. Those termed parasites were supposed to be either poor confidential friends, or guests who were expected to pay for their entertainment by the amusement they afforded, and which sometimes degenerated into buffoonery, and even the grossest flattery.——In Zoology, animals which reside in or upon other animals, deriving nourishment from their bodies.

PARASIT'ICAL PLANTS (*parasitikos*, like a parasite: *Gr.*), in Botany, such plants as grow upon other plants, and receive their nourishment from them. Of this class are the mistletoe, broom-rape, and among exotics, the gigantic *Rafflesia*. They have no proper roots. The term is often applied also to mosses, &c., growing on the bark of trees, but deriving their food from the air by means of their own roots.

PARASTREM'MA (*parastrepho*, I twist from its proper place: *Gr.*), in Medicine, a convulsive distortion of the mouth, or any part of the face.

PARATAX'IS (*Gr.*, from *paratasso*, I arrange side by side), in Grammar, the arranging of propositions, one after another, as they present themselves to the mind, without consideration of their dependence on each other; it is opposed to *syntax*.

PARATH'ESIS (a putting beside: *Gr.*), a term used by some grammarians for apposition, or the placing of two or more nouns in the same case.

PARAVA'IL (*par*, by; and *avail*, profit: *Fr.*—because it was he who was supposed to make profit from the land), in Feudal Law, the lowest tenant holding under a mediate lord, as distinguished from a tenant *in capite*, who holds immediately of the king.

PAR'BUCKLE, in Naval Language, the rolling of a cask, or any cylindrical body, by means of ropes which, having been fastened where the cask, &c., is to go, are laid along the ground, then over the ends of the cask, and back to where they start from.

PAR'CÆ (*Lat.*, from *parcus*, sparing), or the Fates, in the Heathen Mythology, three goddesses who were supposed to preside over the accidents and events, and to determine the date or period, of human life. They were called Atropos, Clotho, and Lachesis, and are variously represented—sometimes as spinning the thread of human life; in which employment Clotho held the distaff, Lachesis turned the wheel, and Atropos cut the thread. It has been supposed that, until the Augustan age, when Greek and Roman mythology became mingled, the Romans had but one *parca*, who was equivalent to the goddess *Mors*, the third of the fates.

PAR'CENER, or CO-PAR'CENER (*parsonier: Fr.*; from *persona*, a person: *Lat.*—because all of them form, as it were, *but one* individual), in Law, a *co heir*, or one who holds lands by descent from an ancestor in common with others. The holding or occupation of lands of inheritance by two or more persons, differs from *joint tenancy*, which is created by deed or devise, whereas *parcenary* is created by the descent of lands from a common ancestor. No right of survivorship exists among co-parceners; but they may agree, or any one may force the rest, to make a partition.

PARCH'MENT (*parchemin: Fr.*), the skins of sheep or goats, prepared in such a manner as to render them proper for writing upon. *Vellum* is a similar preparation from the skins of calves, kids, and lambs. The parchment used for drums is obtained from the skin of asses, calves, and wolves; that for battledores from the skin of asses, and that for sieves from the skin of goats. Parchment is made by preparing the skins as if for tanning; shaving down and pumicing them; then stretching and carefully drying them. When intended for the bookbinder, it is sometimes dyed green with verdigris. The use of parchment is very ancient; the Hebrews had books written on the skins of animals in David's time, and Herodotus relates that the Ionians, from the earliest period, wrote upon goat and sheep-skin, from which the air had been merely scraped off. It was used by Eumenes, king of Pergamus, 250 B C. He could not obtain enough papyrus for the library he was establishing, and employed it as a substitute—whence *pergamena*, its Latin name. In the beginning of the 8th century, it had entirely superseded papyrus: and all the public documents, under Charlemagne, were written upon it.——**Vegetable Parchment**, a tough and durable paper possessing many of the qualities of parchment, prepared by immersing ordinary unsized paper for a short time in strong sulphuric acid, and then washing it free of every trace of the acid.

PARD (*pardus: Lat.*), the leopard or panther. 'A soldier bearded like the pard.' —Shakspere

PAREGOR'IC (*parēgorikos*, soothing: *Gr.*), that which assuages pain.——**Paregoric Elixir**, a camphorated tincture of opium, flavoured with oil of aniseed.

PAREM'BOLE (*Gr.*, from *paremballo*, I put in between), a figure in Rhetoric, by which a paragraph is inserted in the middle of a sentence, for the purpose of explanation. It is called also *paremptosis*, and it may be considered a species of parenthesis, which see.

PARENCHY'MA (*para*, between; *cheuma*, anything effused: *Gr.*), the cellular tissue of vegetables in which the cells are not very elongate, nor very firmly adherent to each other. The pith of plant stems and the soft interior of leaves are examples of parenchyma.

PA'RENT (*parens*, from *pario*, I bring forth: *Lat.*), a term of relationship applicable to those from whom we immediately receive our being. Parents, by the law of the land, as well as by the law of nature, are bound to educate, maintain, and defend their children, over whom they have a legal as well as a natural power they likewise have interests in the profits of their children's labour, during their nonage, in case the children live with and are provided for by them; yet the parent has no interest in the real or personal estate of a child, otherwise than as his guardian. The laws relating to the mutual rights and duties of parents and children are a very important part of every code, and have a very intimate connection with the state of society and with civil institutions. In ancient times, when paternity was a great foundation of civil authority, the parental rights were much more absolute than in modern, extending, in some countries, to the power of life and death, and continuing during the life of the two parties.

PAREN'THESIS (*Gr.*), from *parentithēmi*, I put in beside), in Rhetoric, a figure, by which a few words are inserted in a sentence to explain some portion of it. All kinds of parentheses may be removed, without rendering the sentence grammatically incorrect. The ancients placed in parentheses many things which we put in explanatory notes.

PAR'GASITE, in Mineralogy, a variety of *Actinolite*, from Pargas, in Finland.

PAR'GET, in Architecture, the plaster formed of lime, hair, and cowdung, used in coating a chimney. The use of earthenware pipes in chimneys renders this unnecessary, and is a great improvement.

PARHE'LION (*para*, beside; and *hēlios*, the sun: *Gr.*), in Astronomy, a mock sun, or meteor, having the appearance of the sun itself, and seen by the side of that luminary. Parhelia are sometimes double, sometimes triple, and sometimes even more numerous; and they are always connected with one another by a white horizontal circle. They are formed by the reflection of the sun's beams on a cloud suitably situated: and are accounted for by supposing an infinity of small particles of ice floating in the air, which multiply the image of the sun by refraction or reflection. Parhelia, which appear on the same side of the circle with the true sun, and sometimes are part of the circle itself, are tinted with prismatic colours; which is never the case with those on the opposite side; hence it is supposed that the former are produced by reflection, the latter by refraction.

PA'RIAN MAR'BLE, a sort of white marble, so called from the island of Paros, where it was first found.——PARIAN CHRONICLE [See ARUNDELIAN MARBLES.]

PA'RIAHS, a degraded tribe of Hindoos, who live by themselves in the outskirts of towns, and, in the country, build their houses apart from the villages, or rather have villages of their own; they possess, strictly speaking, no caste. They dare not, in cities, pass through the streets where the Brahmins live, nor enter a temple of the superior castes. They are prohibited from all approach to anything pure, and are doomed to perform all kinds of menial work.

PARI'ETAL BONES (*parietalis*, pertaining to walls: *Lat.*), in Anatomy, two arched bones situated on each side of the superior part of the cranium. They are thicker above than below; but are somewhat thinner, and at the same time more equal and smooth, than the other bones of the cranium. In new-born infants the *ossa parietalia* are separated from the middle of the divided *os frontis* by a portion of the cranium then unossified.——PARIETAL, in Botany, a term applied to the placentas (the parts of an ovary to which the seeds are attached) when they grow from the walls of the ovary. When the placenta is unconnected with the walls, it is styled a free central placenta, but this seldom occurs.

PAR IMPAR (even, odd: *Lat.*), in Antiquity, a game of chance practised among the Greeks and Romans. It was identical with the game of 'even or odd' practised by the boys of modern times.

PAR'IS, PLASTER OF, *gypsum* or sulphate of lime, found in abundance near Paris. The moisture having been expelled by heat from gypsum or alabaster, and the resulting substance ground, it becomes *plaster of Paris*. This powder has the property, when a certain quantity of water is added to it, of becoming very rapidly solid, heat being evolved—a fact known to the ancients. If, during calcination, it be raised to a temperature which is too high, it will assume the characters of *anhydrite*, and will not set on adding water. Plaster of Paris is used for casts, stucco work, and for mixing with lime to form a plaster which will harden quickly. Hot water, or salt and water, hasten the setting of plaster of Paris; size, beer, or wine mixed with the water, retards it four or five hours

PAR'ISH (*paroisse*: *Fr.*; from *paroikia*, a neighbourhood: *Gr.*), in England a district assigned to a church either from time immemorial or by act of parliament. Some parishes are, however, so large and populous, that they contain one or more chapels of ease. At first parish and diocese seem to have been synonymous; afterwards the diocese was formed into several parishes. England was divided into parishes at least as early as 970. Their boundaries generally coincided with those of manors, for a manor seldom extended over more than one parish, though the latter might contain several manors. Besides parishes, there are other places termed *extra-parochial*, that is, not within the limits of any parish. They were formerly the site of religious houses, or of castles, whose owners would not permit any interference with their rights There are in England and Wales about 10,700 parishes, and nearly 2500 in Ireland.

PARK (*pearruc*: *Sax.*), a large quantity of ground, enclosed and privileged for beasts of the chase. To constitute a park, three things are required—a royal grant or licence; enclosure by pales, a wall, or a hedge; and beasts of chase, as deer, &c. There are parks *in reputation*, and not erected by warrant. At present, any considerable extent of pasture and woodland surrounding the country residence of a person of rank, devoted to the purposes of recreation, but chiefly to the support of a herd of deer, and sometimes of cattle and sheep, is called a *park*.——PARK also signifies a large net placed on the margin of the sea, with only one entrance, which is next the shore, and is left dry by the ebb of the tide.——PARK OF ARTILLERY, a place in the rear of an army for encamping the artillery, which is formed in lines, the guns in front, the ammunition-waggons behind the guns, and the pontoons and tumbrils constituting the third line. The phrase is also applied to denote the whole train of artillery belonging to an army or division of troops.——PARK OF PROVISIONS, the place where the sutlers pitch their tents and sell provisions, and that where the bread-waggons are stationed.

PAR'LIAMENT (*parlement*, from *parler*, to speak: *Fr.*), the grand assembly of the three estates in Great Britain, or the great council of the nation, consisting of the sovereign, lords, and commons, which forms the legislative branch of the government. The word *parliament* was introduced into England under the Norman kings. In France it was used to signify the principal judicial courts of the country, as well as deliberative assemblies. The supreme council of the nation was called by our Saxon ancestors the *wittenagemote*, or meeting of wise men or sages. A parliament is called by a writ or letter from the sovereign, directed to each lord, summoning him to appear; and by writs sent by the lord chancellor, under the great seal, commanding the sheriffs of each county to take the necessary steps for the election of members for the county and the boroughs contained in it. Parliament *must* be held at least once every three years; but as the mutiny act, land tax and malt act, are passed only for a single year, its meetings are of necessity annual. On the day appointed for the opening of parliament, the sovereign sits in the house of lords under a canopy, dressed in robes, as are all the lords in theirs, and the commons being summoned to the bar of that house, the sovereign addresses both houses on the state of public affairs. The commons are then required to choose a speaker, which officer being presented to and approved by the sovereign, the latter withdraws, the commons retire to their own house, and the business of parliament begins. In the *house of lords*, the seat of each member is prescribed according to rank, though, except in the presence of the sovereign, this formality is almost wholly dispensed with. The princes of the blood sit on each side of the throne; the two archbishops on the sovereign's right hand; the bishops of London, Durham, and Winchester, below the former; and the other bishops according to priority of consecration. On the left hand of the sovereign, above all the dukes except those of the blood-royal, sit the lord-treasurer, lord-president, and lord privy-seal; then the dukes, marquises, and earls, the individuals of each class taking precedence according to the date of their creation. Across the room are woolsacks, continued from ancient custom; and on the first of these, immediately before the throne, sits the lord-chancellor, as speaker of the house. On the other woolsacks are seated the judges and queen's counsel who are serjeants-at-law, who only give their advice on points of law. There are sixteen representative peers for Scotland, who are elected for a single parliament, and twenty-eight for Ireland, who are chosen for life. There are 2 archbishops, and 24 bishops from England and Wales, with 1 archbishop and 3 bishops from Ireland by rotation of session. Three peers constitute a house. Peers may vote by proxy, and enter on the journals of the house their dissent and reasons for it, called a *protest*. The house of peers has a jurisdiction both in civil and criminal cases; and appeals lie to it from the highest tribunals in the land. It consists of about 460 members—namely, 3 peers of the blood-royal, 2 archbishops, 20 dukes, 20 marquises, 111 earls, 22 viscounts, 24 bishops, 210 barons, 16 representative peers for Scotland, 28 representative peers for Ireland, and 4 Irish representative prelates. In the *house of commons* there are no peculiar seats for any members. The speaker only has a chair appropriated to him at the upper end of the house, and at a table before him sit the clerk and his assistant. When the parliament is thus assembled, no member is to depart without leave. Upon extraordinary occasions all the members are summoned; otherwise three hundred of the commons is reckoned a full house. Clergymen, peers, Scotch peers, the judges of England, the Scotch judges, and barons of the Scotch exchequer, are ineligible to the house of commons, also persons holding many offices supposed to cause a direct influence by the government, and pensioners during pleasure. Irish peers cannot be elected for places in Ireland, nor the eldest sons of Scotch peers for places in Scotland. The acceptance of any post of profit from the crown causes a member to vacate his seat; likewise the acceptance of the stewardship of the *Chiltern Hundreds*, or that of the manor of *East Hendred*, to which there are no profits attached; officers of the army obtaining new commissions, and persons receiving foreign appointments, such as the post of ambassador, &c., are excepted. The acceptance of the stewardship of the Chiltern Hundreds is the usual mode of vacating a seat in the house of commons. Bankruptcy prevents a member from taking his seat for a year; and if, within that time, the commission is not superseded, or the creditors are not paid, he loses his seat. In the commons, there is no house, nor committee of the whole house, if 40 members are not present. The speaker of the house of commons cannot speak in the house, but the speaker of the house of lords may. When there is a *call* of the house, a member absent without leave may be taken into custody. Every year the order for the sergeant-at-arms to take into custody strangers who are in the gallery is repeated, so that, by a kind of fiction, the house of commons is supposed to sit with closed doors. When the speaker's mace is *on* the table, it is a house; when *under* the table, a committee. When the speaker is out of the house, no business can be done. Members can speak only once, except in committee, or in explanation. All private bills affecting the peerage must begin with the lords: all others may begin in either house. A bill for a general pardon begins with neither house, but with the crown. All money bills must begin with the house of commons, and the lords can make no amendments in a bill which are likely to bring a charge on the people, nor can they insert or alter pecuniary penalties or forfeitures. The house of commons consists of 658 members—namely, 500 from England and Wales, 105 from Ireland, and 53 from Scotland. The method of making laws is much the same in both houses. In each the act of the majority binds the whole; and this majority is declared by votes openly given, not privately or by ballot. To bring a bill into the house of commons, if the relief sought by it is of a private nature, it is first necessary to prefer a petition, which must be presented by a member, and usually sets forth the grievance desired to be remedied. In public matters, the bill is brought in upon motion made to the house without any petition. A *committee of the whole house* is composed of all the members; to form it, the speaker quits the chair (another member being appointed chairman), and he may then join in the debate like any other member. In such committees, the bill is debated clause by clause, amendments made, the blanks filled up, and sometimes the bill entirely new-modelled After a bill has gone through the committee, the chairman reports it to the house, with such amendments as the committee have made; then the house reconsiders the whole bill, and the question is put upon every clause and amendment. When the house has agreed or disagreed to the amendments of the committee, and sometimes added new amendments, the bill is ordered to be engrossed. As soon as this is finished, it is read a third time, and amendments are sometimes then made to it; and if a new clause be added, it is done by tacking a separate piece of parchment on the bill, which is called a *rider*. The speaker then again opens it, and, holding it up in his hands, puts the question whether the bill shall pass. If this be agreed to, the title is then settled, and one of the members is directed to carry it to the lords for their concurrence. When both houses have done with any bill, it is always deposited in the house of peers, to await the royal assent, except in the case of a money bill, which, after receiving the concurrence of the lords, is sent back to the house of commons The answer to the question put by the speaker, or the chairman, in the house of commons, is *Ay* or *No*, and, in the house of peers, *Content* or *Not Content*. The royal assent to bills may be given, either in person (when the sovereign appears on the throne in the house of peers, regally attired), or by letters patent under the great seal, and duly signed. And when the bill has received the royal assent in either of these ways, it is then, and not before, a statute or act of parliament. Parliament is *prorogued* from one session to another by royal authority; committees are not dissolved by prorogation, but are merely adjourned to the next time of meeting It is dissolved by the sovereign's will, by the demise of the crown, or by lapse of time—at the end of the seventh year, should it not have been dissolved sooner

PARLIAMENTA'RIANS, an epithet for those who sided with the English republican parliament in opposition to king Charles I.

PAR'ODY (*parōdia*, from *parōdeo*, I sing with certain changes: *Gr.*), a kind of writing in which the words of an author or his thoughts are, by some slight alterations, adapted to a different purpose; or it may be defined, a poetical pleasantry in which the verses of some author are, by way of ridicule, applied to another object; or a serious work is turned into burlesque by affecting to observe the same rhymes, words, and cadences.

PAR'OL (*parole: Fr.*), in Law, an epithet for what is done by oral declaration, as *parol evidence*, which is testimony by the mouth of a witness in contradistinction to written evidence.

PARO'LE (*Fr.*), in Military affairs, a promise given by a prisoner of war, when suffered to be at large, that he will return at a time appointed, unless he shall have previously been discharged or exchanged. ——PAROLE also means the watchword given out every day in orders by a commanding officer, in camp or garrison by which friends may be distinguished from enemies

PAROMOL'OGY (*paromologia*, from *paromologeo*, I pretend to admit: *Gr.*), in Rhetoric, a figure of speech by which an orator concedes something to his adversary, in order to strengthen his own argument.

PARONOMA'SIA (*Gr.*, from *paronomazo*, I slightly change a word), a Rhetorical figure by which the same word is used in different senses; or words similar in sound are put in opposition to each other, so as to produce the effect of antithesis

PARONY'CHIA (*parōnuchia*, from *para*, beside; and *onux*, the nail: *Gr.*), in Medicine, a *whitlow*, or abscess formed near the nails or tips of the fingers.

PAROQUET'S, or PARRA'KEETS (*perroquet*, a parrot: *Fr.*), a tribe of parrots usually of a small size, and differing from other parrots in the form of the feet. They are natives of India and Australia.

PAROT'ID GLAND (*parōtis*, the gland beside the ear: *Gr.*), in Anatomy, a large conglomerate and salivary gland, situated under the ear, between the maxillary process of the temporal bone and the angle of the lower jaw. The excretory duct of this gland opens in the mouth, and is called, from its discoverer, the *Stenonian* duct.

PAROTI'TIS (from same), inflammation of the parotid gland; the *mumps*.

PAR'OXYSM (*paroxusmos*, from *paroxuno*, I make violent: *Gr.*), in Medicine, a fit of higher excitement or violence in a disease that has remissions or intermissions: as the *paroxysm* of a fever or the gout.

PAR'REL, among seamen, a collar of greased rope, which confines the yard to the mast while it is hoisted up.

PAR'RICIDE (*parricida*, from *patricida*: *Lat.*), strictly signifies the murder or murderer of a father, as *matricide* does of a mother; yet this word is ordinarily taken in both senses, and is also extended to the murder of any near relation. The word *parricide* is also applied to one who fatally injures any of those to whom he owes particular reverence, as his country or patron. By the Roman law parricide was punished in a severer manner than other kinds of homicide. After being scourged, the delinquent was sewed up in a leathern sack, with a live dog, a cock, a viper, and an ape, and then cast into the sea Solon made no law against parricide, supposing it impossible that any one should be guilty of so unnatural a crime; nor had the Romans any law against it originally. We treat it as any other murder; but, in some German states, the parricide is put to death with exquisite tortures.

PARRICI'DIUM (*Lat.*, from same), a name given by a decree of the Roman senate to the *Ides of March*, which was the anniversary of Cæsar's assassination. Dolabella the consul proposed a law to change its name to *Natalis Urbis*, as he looked on it as the birthday of Roman liberty.

PAR'ROTS (*perroquet*, a parrot: *Fr.*), a large family of scansorial birds, the *Psittacidæ* of ornithologists. They abound in tropical climates. There are several divisions or subfamilies, viz., the parrakeets, macaws, lories, cockatoos, owl-parrots, and true parrots. The last are the best known species, on account of their docility in captivity, and their power of articulating words in imitation of the human voice. Their hooked bill is very serviceable to them in climbing. They breed in hollow trees, subsist on fruits and seeds, and often attain a great age. The common grey parrot, a native of Africa, is the most remarkable for its loquacity, docility, and distinctness of articulation. The green parrot of South America is also remarkable in these respects. The pretty little love birds fall into this division.

PARSEE'S (*pars*, the ancient name of Persia), those who profess the religious system of ZOROASTER, the dominant religion in Persia until expelled by Mahommedanism. Those who refused to renounce their ancient faith fled from the country. The modern Parsees are chiefly resident in Bombay, where several of them are persons of great wealth.

PAR'SING (*pars*, a part: *Lat.*), in Grammar, the resolving a sentence into its elements, by showing the several parts of speech of which it is composed, and their relation to each other according to grammatical rules.

PAR'SLEY (*petra*, a rock; and *selinon*, parsley: *Gr.*), a well known umbelliferous plant, the *Petroselinum sativum* of botanists. Among the Greeks, parsley was used for decorating tombs, and consequently was regarded as a vegetable not much calculated to contribute to agreeable sensations. It was, however, the herb of which, in the Isthmian and Nemean games, the crowns of the victors were composed. Among the Romans, parsley was considered a necessary ingredient in their festive garlands, because it retains its freshness a long time, affords a grateful smell, and was supposed to absorb the inebriating fumes of wine, and by that means prevent intoxication.

PARS'NEP (*pastinaca: Lat.*), a well-known culinary vegetable, the *Pastinaca sativa* of botanists, the root of which is deemed a valuable esculent. Besides their use for the table, parsneps are often cultivated on an extensive scale as fodder for cattle. The milk of cows is improved in quality and increased in quantity by them; and they give the butter a fine saffron-yellow colour, as well as excellent flavour. Since the roots are not liable to injury from frosts, they may remain in the ground all the winter, and be taken up as required.

PAR'SON (*persona*, a person: *Lat.*), the rector or incumbent of a parish, who has the parochial charge or cure of souls; one who possesses all the rights of a parochial church; in his person (whence the name), the church he occupies is represented. He has the freehold of the parsonage, glebe, the tithes, and other dues. He must be in holy orders, presented, instituted, and inducted. A parson has a right to all the ecclesiastical dues of the parish; a *vicar* has generally an appropriator over him, who is entitled to the best part of the profits, and to whom, in fact, he is perpetual curate. In common language, any clergyman is called a parson.

PAR'SONAGE (last), ordinarily, a rectory endowed with a house, glebe, lands, tithes, &c., for the maintenance of the incumbent; but there may be a parsonage without either glebe or tithes, and with only annual payments.

PARTE'RRE (*Fr.*), in Gardening, a system of beds of various shapes and sizes, in which flowers are grown, with intervening spaces of gravel or turf for walking upon. The beds are very often bordered with dwarf box, kept low by clipping. This kind of parterre was in use among the Romans. ——PARTERRE, in France, the pit of a theatre.

PARTHE'NOGENESIS (*parthĕnos*, a virgin; *genesis*, generation: *Gr*), a term applied by naturalists to cases amongst animals and plants where a perfect embryo is alleged to be formed in the absence of male organs.

PAR'THENON (*Parthenōn*, from *parthenos*, a maiden—one of the names of Minerva: *Gr.*), the name given to the celebrated Grecian temple of Minerva, erected in the Acropolis of Athens, during the splendid era of Pericles. It was built of marble upon a spot elevated on all sides above the town and citadel; and was of the Doric order. It was a peripteral octostyle, with seventeen columns on the sides, each 6 feet 2 inches in diameter at the base, 34 feet in height; and was elevated on three steps. Its height was 65 feet; and its area was 233 by 102 feet. It was decorated with magnificent groups and statues, and its cost has been estimated at a million and a half sterling. This magnificent temple, which had been in turn converted into a Christian church and a Turkish mosque, had resisted all the ravages of time; but in the year 1687, when the Venetians besieged the citadel of Athens, under the command of General Konigsmarck, a bomb fell most unluckily upon it, setting fire to the powder which the Turks had stored up within it. This destroyed the roof, and reduced the whole building almost to ruins. It is still magnificent, though greatly dilapidated. The chief portion of its sculptures are now in the British Museum, and form, with some other remains of antiquity, the collection termed the *Elgin marbles*.

PARTHEN'OPE, one of the small planets belonging to the group between Mars and Jupiter, and the eleventh in the order of discovery.

PAR'TIAL (*pars*, a part: *Lat.*), in Botany, an epithet for *subordinate*; as, a *partial* umbel, a *partial* peduncle. A partial involucre is placed at the foot of a partial umbel.

PAR'TICEPS CRIM'INIS (a sharer in the

crime: *Lat.*), in Law, an accomplice, or one who participates in the guilt.

PAR'TICIPLE (*participium*, from *particeps*, sharing: *Lat.*), in Grammar, a word so called because, in certain languages, it participates in the nature both of a noun and a verb; being variable through the genders, numbers, and cases, like the former, and regarding time, action, &c., like the latter. Participles sometimes lose the properties of a verb, and become adjectives: as, she is a girl of *engaging* manners; that man is an *accomplished* orator.

PAR'TICLE (*particula*, the *dim.* of *pars*, a part: *Lat.*), in Physics, one of those minute portions of a body, the aggregation or collection of which constitutes the whole mass. Sometimes the word is used in the same sense as *atom*.—— PARTICLES, in Grammar, such parts of speech as are incapable of any inflection: as the preposition, conjunction, &c. The term is, however, more accurately applied to those minor words, which give clearness and precision to a sentence, but respecting whose exact use grammarians are not agreed. Thus, in Greek, *ge, ara, dē*, &c.; in German, *ja, wohl*, &c.; in English, *now, then, truly*, &c. It is also used to indicate those words which are termed *enclitics*, and which cannot be used separately, but must be joined with another word: as the *que*, in *virumque*, in Latin.

PARTI'TE (*partitus*, from *partio*, I divide: *Lat.*), in Botany, an epithet for divided; thus, a *partite* leaf is a simple leaf separated down to the base.

PART'NERS (from *part*), in a ship, strong pieces of timber bolted round the mast, at the deck, to support the latter against its pressure; also similar supports round the capstan and pump.

PART'NERSHIP, the association of two or more persons for the prosecution of any trade, manufacture, or commercial enterprise, at their joint expense. In this case the connection is formed by contract; each partner furnishing such a part of the capital stock, and being entitled to such a proportional share of profit, and subject to such a proportional share of loss as may be agreed upon; or one or more of the partners furnishing money or stock, and the others contributing their services. A partnership or association of this kind is a standing or permanent company, and is denominated a *firm* or *house*. By a recent act of parliament, persons simply lending money to a firm, and receiving in return a share of the profits instead of interest, are protected from liability for the debts of the firm. There is no particular form of contract necessary for partnership, nor even a writing. If no period has been fixed for its dissolution, any one partner may dissolve it; and if a period has been fixed, it will be dissolved, in the absence of a proviso to the contrary, by the bankruptcy, attainder, death, or, in the case of a female, the marriage of a partner; but, as far as the public is concerned, notice must be given that it has been dissolved. The partnership will be bound by the engagements of any partner, acting with reference to the joint business. By means of the act called incorporation, or by régistration as a 'limited company, the shareholders in a joint-stock company may protect themselves' from all liability beyond the amount of their shares.

PART'RIDGE (*perdrix*: *Fr.*; from *perdix*: *Gr.*), the *Perdix cineréa*, a well-known bird. The common partridge is found all over Europe. The places in which partridges most delight are corn-fields, especially whilst the corn is growing, for under cover of it they shelter and breed; and these are frequented by them when the corn is cut down, for the sake of the grain scattered over them. The *red-legged Partridge*, a bird less esteemed both by sportsmen and epicures, is the *Perdix rufa* of ornithologists.

PAR'TY (*partie*: *Fr.*), in Politics, a number of persons, united for the purpose of promoting, by their joint endeavours, their own views, according to some principles on which all of them are agreed. From the earliest times, mutual co-operation has been adopted for the execution of favourite designs. But there is a tendency, in party, to generate narrow, false and illiberal principles—a thorough follower of a party is, in some sense, a slave. Free governments are the hotbeds of party, and probably, without the existence of opposing parties in a state, civil freedom would no longer exist. *Party* differs from *faction* in implying a less dishonourable association of persons, or more justifiable designs.—— PARTY, in Heraldry, the division of a field by a line running in the direction of an ordinary: thus, *party per pale, party per fesse*, &c.—— PARTY, in Military affairs, a small detachment or number of men sent upon any particular duty, as a recruiting party, &c.—— PARTY-WALLS, when houses are built in contact the law requires that each shall have its own wall in order to prevent the spread of fire, and these walls are called party walls. —— PARTY-JURY, in Law, a jury consisting of half foreigners and half Englishmen.

PARU'LIS (*paroulis*: from *para*, beside; and *oula*, the gums: *Gr.*), in Medicine, an inflammation, boil, or abscess in the *gums*: a *gum-boil*.

PAS'CHAL CY'CLE, the cycle which serves to show when Easter occurs. It is formed by multiplying together 28, the cycle of the sun, and 19, the cycle of the moon.

PA'SHA, the name of officers in the Turkish empire who, when appointed to provinces, are at once military commanders, judges, and receivers of taxes. They are divided into three classes, viz., pashas of one, two, and three tails. The vizirs and serasker, or commander-in-chief, are pashas of three tails. The word is derived from the Persian, and signifies 'the foot of the Shah.' It had been usual from an early period to style the ministers of the Persian king his feet, hands, eyes, &c.; the governors of provinces, as the chief supporters of the empire, being called his feet.

PASIG'RAPHY (*pas*, all; and *grapho*, I write: *Gr.*), a system of universal writing, or a mode of writing what may be understood and used by all nations. Numerous attempts have been made to construct a universal language, particularly by the philosophic and persevering Germans; but hitherto all their efforts have been fruitless.

PASQUINADE' (*Fr.*), a satirical writing, directed against one or more persons. A mutilated statue, which was dug up at Rome nearly 300 years ago, and which now lies in the court of the Capitol, was named *Pasquin*, after an eccentric barber, near whose house it was at first set up. To this, and another statue near it, named *Marforio*, satirical placards, some of which were very severe, and reflected on the highest personages, were affixed at night. Sixtus V. was greatly offended when one of them demanded 'why his shirt was so soiled,' and was answered by the other that 'his washerwoman' (by whom was meant the pope's sister) 'had become a princess.' All satirical compositions in Rome have long been attributed to Pasquin, or pasted upon it. Hence the word *pasquinade* for a lampoon. The difference between a *pasquinade* and a *satire* is, that the end of the latter is to correct and reform, while that of the former is only to ridicule and expose.

PASS (*pas: Fr.*), in Military affairs, a narrow passage, which renders the entrance into a country difficult for an army.——**Pass**, among Miners, a frame of boards set sloping for the ore to slide down.——**Pass of Arms**, in Chivalry, a bridge, road, &c., which the ancient knights undertook to defend They who held a pass hung up their arms on trees, pales, columns, &c., erected for that purpose; and such as were disposed to dispute the pass touched one of the pieces of armour with his sword, a challenge which the other was obliged to accept.——**Pass parole**, in Military affairs, a command given at the head of an army, and communicated by word of mouth to the rear.——**Pass-word**, a secret word or countersign, which enables any person to pass through military stations.

PASSAD'E, or **PASSA'DO** (a push: *Ital.*), in Fencing, an advance or leap forward upon the enemy. Of these there are several kinds, as passes within, above, beneath, to the right, the left, and passes under the line, &c.——**Passade**, in the manège, a turn or course of a horse, backwards or forwards, on the same spot of ground.

PAS'SAGE (*Fr.*), in Music, a succession of sounds, forming a member or phrase in a composition.——**Birds of Passage**, those birds which at certain seasons migrate, or pass from one climate to another. [See **Migratory Birds**, &c.]——**Right of Passage**, in Commerce, an imposition or duty exacted by some princes, either by land or sea, in certain confined or narrow portions of their territories, on all vessels, and even sometimes on passengers, coming in or going out of them.

PAS'SANT (*Fr.*), in Heraldry, a term applied to a lion or other animal in a shield, appearing to walk leisurely. When walking with his head *affronté*, or looking full-faced, it is termed *passant gardant*.

PASSE-PARTOUT (*Fr.*), a master-key, or a key that answers for several locks belonging to the same house or apartment.

PAS'SERES (*Lat.*), in Ornithology, the name given to an order of birds which exhibit neither the violence of birds of prey nor the fixed regimen of the terrestrial birds, but which feed on insects, fruit or grain, and even small birds. They form the largest and least recognizable order. The females are generally smaller, and have less brilliant plumage than the males; they live in pairs, and build their nests in trees with great ingenuity. Power of flight, melody of voice, and brilliancy of plumage, are found in the highest perfection in one group or another of this extensive and varied order. As their beak varies according to the nature of their food, it has caused their classification into *Dentirostres*, having a notch and tooth-like process on each side of the margin of the upper mandible, as in the thrushes and flycatchers. *Conirostres*, having a thick, robust, conical beak, as amongst the crows and finches. *Tenuirostres*, having a long and slender bill, as amongst the humming birds and creepers; and *Fissirostres*, having a beak opening widely, as amongst the swallows and goat suckers.

PAS'SIM (*Lat.*), a word of reference in books, signifying here and there; throughout; in many different places.

PAS'SING-BELL, the bell that is tolled immediately after death. The *passing-bell* was, at first, superstitiously intended to drive away any demon that might seek to take possession of the *soul* of the dying, on which account it was sometimes called the *soul-bell*.

PAS'SION-FLOWERS, a genus of climbing plants: nat. ord. *Passifloraceæ*; containing numerous species, remarkable for the elegance and singular form of their flowers. They are all natives of warm countries, and only one of them is sufficiently hardy to succeed well here in the open air, the others requiring shelter and heat. Their stems are woody, or, more frequently, herbaceous, provided with tendrils, and bearing alternate simple or lobed leaves; the flowers are axillary, and supported on peduncles; the calyx is widely spreading, and divided into ten parts. To the base of the calyx is attached an interior crown, composed of a great number of filaments. The *Passiflora cærulea*, or blue-rayed common palmated passion-flower, has long slender stalks, ascending, upon any support by their claspers, thirty or forty feet high, with one large palmated leaf at each joint, and at the axillas large spreading flowers, with whitish-green petals, and a blue radiated nectarium—succeeded by large, oval, yellowish fruit. It flowers from July until October; the flowers are very large and conspicuous, and their composition is exceedingly curious and beautiful; but they are only of one day's duration, generally opening about 11 or 12 o'clock and gradually closing the next day, when they assume a decayed appearance, and new flowers succeed. In some Roman Catholic countries, this flower is greatly venerated, because the instruments of Christ's passion are supposed to be represented by the parts of fructification, &c.

PAS'SIVE (*passivus: Lat.*), in Grammar, a term given to a verb which expresses the effect of an action performed by some agent; as, in Latin, *doceor*, I am taught, or, in English, she *is loved.*——PASSIVE COMMERCE, trade in which the productions of a country are carried by foreigners in their own ships; opposed to *active* commerce. [See NAVIGATION LAWS.]——PASSIVE OBEDIENCE, in Civil Polity, denotes not only quiet unresisting submission to power, but implies the denial of the right of resistance, or the recognition of the duty to submit in all cases to the existing government.——PASSIVE PRAYER, among mystic divines, is a suspension of the soul or intellectual faculties, and a yielding only to the impulses of grace.

PAS'SOVER, or PAS'CHA, a solemn festival of the Jews, celebrated on the 14th day of the month following the vernal equinox; and instituted in commemoration of their providential deliverance on the night before their departure from Egypt, when the destroying angel, who put to death the first-born of the Egyptians, *passed over* those houses of the Hebrews which were sprinkled with the blood of a lamb.

PASS'PORT (*passeport: Fr.*), a written license from a king, governor, or other proper authority, granting permission to pass through his territories, or from one country to another, or to navigate a particular sea, without molestation. Also, a license for importing or exporting goods or moveables without paying the usual duties. A passport usually describes the person, objects, and destination of the bearer; it is also intended to show that his character is good, and that his design in travelling is lawful. Passports are granted by the foreign office to respectable persons, on payment of a small fee; but they may be obtained from the ambassadors, ministers, and consuls of the various states. They must have the *visé* of the ambassadors or consuls of the countries into which the traveller intends to go. Austria and Russia are very particular on this point. Passports have, until very recently, been required by the natives of nearly all European countries, when they pass even from one part of their own state to another.

PASTE (*pâte: Fr.*), a soft composition. Also, a kind of coloured glass made to imitate gems.——In Mineralogy, the mineral substance in which other substances are imbedded.

PAS'TEL (*pastillus*, a roll: *Lat.*), in Painting, a crayon formed with any colour and gum-water, and used for painting on paper or parchment. The pictures produced with pastels are not durable.

PAS'TERN (*pasturon: Fr.*), that part of a horse's foot which is under the fetlock and reaches to the heel.

PASTIC'CIO (*Ital.*, from *pasticco*, a pie), in Music, a word used to denote an opera composed of detached airs, by different composers, occasionally introduced.——In Painting, a picture painted by a master, in imitation of the style of some other painter. Teniers and Luca Giordano were very successful in this way.

PIS'TIL (*pastille: Fr.*; from *pastillus: Lat.*), in Pharmacy, a species of lozenge; also a compound of charcoal with odoriferous matters, which diffuses an agreeable odour during its slow combustion.

PAS'TORAL (*pastoralis*, pertaining to shepherds: *Lat.*), something descriptive of a shepherd's life; or a poem in which any action or passion is represented by its effects on a country life. The characteristics of this poem are simplicity, brevity, and delicacy; the two first of which render an eclogue or idyl natural, and the last delightful. As the earliest strains of poetry must have been heard in the primitive times of the human race, and as a shepherd's life is supposed to be congenial with such effusions, we naturally consider poetry as having originated in the pastoral period, but the poetic idea of pastoral life, where all is purity and simplicity, is not supported by experience, either in ancient or in modern times.——PASTORAL, in Ecclesiastical affairs, a book relating to the cure of souls, it includes the execution of the duties of a clergyman, or the practical application of his theological knowledge. The chief part of canon law is comprised in the *Pastoral* of a Roman Catholic priest, while that of the Protestant minister consists of principles addressed merely to his understanding, including certain rules which experience has shown to be important for the performance of clerical duties.

PAS'TURE, or PAS'TURE LAND (*pastura*, from *pascor*, I feed: *Lat.*), in Agriculture, ground covered with grass appropriated for the food of cattle. *Perpetual pastures* are such as are never subjected to the plough, and never manured except by the cattle which feed on them. *Artificial pastures* are sometimes mown, and sometimes receive a top dressing of dung, &c.

PATA'CHE (*Fr.*), a tender or small vessel employed in conveying men, or orders from one ship to another.

PATAVIN'ITY, a term used by classical scholars to denote a peculiarity of Livy's diction, so denominated from *Patavium* or *Padua*, the place of his nativity.

PATE, in Fortification, a kind of platform, resembling what is called a horseshoe; not always regular, but generally oval, encompassed only with a parapet, and having nothing to flank it.

PATEE', or PATTEE' (*Fr.*), in Heraldry, a cross, having the arms small in the centre and widening towards their extremities, which are broad.

PATEL'LA (*patella*, a small dish: *Lat.*), in Anatomy, a bone which covers the fore part of the joint of the knee, called also *rotula*, and popularly the *knee-pan*. The patella is composed internally of a cellular substance, covered by a thin bony plate; but its cells are so extremely minute, that its strength is upon the whole, very considerable. It defends the articulation of the joint of the knee from external injury; and likewise increases the power of the muscles which act in the extension of the leg, by removing their direction further from the centre of motion.——PATELLA, in Conchology, a genus of shell-fish, with a simple shell, of a conic or other gibbous figure, and a very wide opening at the mouth or bottom. The animal is popularly termed a limpet.

PAT'ENTS, or LET'TERS-PA'TENT (*patens*, open: *Lat.*), writings sealed with the great seal, granting a dignity, an office, or a privilege, or authorizing something which a person could not otherwise do or enjoy. They are called *patent* on account of their being open, and ready to be exhibited for the confirmation of the authority delegated by them. Peers of the realm are created, the Lord Chancellor, the Lords of the Treasury, and several other officers of state are appointed by letters patent.——LETTERS PATENT FOR INVENTIONS. Inventors can obtain letters patent from the Crown protecting such inventions as they have themselves made, or as they have derived from foreigners not domiciled in Great Britain. The invention must be new and useful. A bare principle not showing any practical application is not patentable. A provisional specification may be lodged in the first instance, and protection for the invention obtained for six months; but before the expiration of this period a complete specification must be prepared, describing fully and clearly the whole invention, and this must be lodged with the Commissioners of Patents. The invention is then secured for three years; a payment of £50 will secure an additional term of four years, and the payment of the further sum of £100 will extend the patent for an additional term of seven years, that is fourteen years altogether. The specification is an important instrument, and many patents have become invalid by reason of their not complying with the rules which the courts of law have laid down. 'Letters patent (says Johnson's Patentee's Manual) are founded upon an implied compact between an inventor and the public. The latter, through the Crown, secures to the former the monopoly of the invention with all the advantages flowing therefrom, for a given period of time; and the inventor on his part undertakes to tell the community what his invention really is, and to teach them how it may be practised and carried into effect when the monopoly shall have ceased. It is by this instrument that the public is made acquainted with the inventor's secret, and he is bound in return for the privilege granted to him to describe it clearly and fully, with the view of enabling others, when the proper time comes, to work the invention, if they desire to do so. In the mean time, the public are entitled to know what it is they are prohibited from using, that they may not unawares incur liability.' All specifications are now printed, and they may be obtained at a low charge at the office of the Commissioners, who also issue periodical lists of patents granted. The Privy Council has the power of extending the term of a patent for a further period not exceeding fourteen years, but more than seven years is seldom granted, and then only on the patentee showing that the invention is a valuable one, and that he has not been rewarded according to his deserts. In case of infringement, a patentee may proceed either by an action for damages, or file a bill in chancery for an injunction and an account. Foreign states also grant letters patent for inventions, called in France *Brêvets d'invention.* And an English patentee usually obtains patents abroad when the invention is of considerable utility.

PAT'ERA (a broad dish: *Lat.*), in Architecture, an ornament frequently seen in the Doric frieze, and in the tympans of arches. The patera was a small dish or vase in which the Romans offered consecrated food to the gods, and with which they made libations; and hence it became an ornament of the Doric order, as that was used for temples. It was also enclosed in urns with the ashes of the dead, after it had been employed in the offerings of wine and other liquors at the funeral.

PAT'ERNOSTER (our Father: *Lat.*), the Lord's prayer, so called from the two words with which it commences in Latin. The term is sometimes applied also to the *rosary*, or string of beads, used by Roman Catholics in their devotions, but more especially to every tenth large bead; for at this they repeat the Lord's prayer, and, at the intervening small ones, only an *Ave Maria.*——In Architecture, an ornament cut in the form of beads, either oval or round, for astragals, &c.——PATERNOSTER CROSS, in Heraldry, a cross represented on the escutcheon as if made with beads.

PATHET'IC NERVES (*pathētikos*, sensitive: *Gr.*), in Anatomy, a pair of very small nerves which arise in the brain, and run to the trochlear muscle of the eye. They have obtained the appellation *pathetic*, from their serving to move the eyes in the various passions.

PATHOGNOMON'IC (*pathognōmonikos*: from *pathos*, suffering; and *gnōmonikos*, fit to give judgment: *Gr.*), in Medicine, a term applied to those symptoms which are peculiar to, or exclusively characteristic of, a particular disease.

PATHOL'OGY (*pathologeo*, I treat of disease: *Gr.*), that branch of medicine which is concerned with diseases, their causes and symptoms. Its objects are to ascertain the various symptoms which characterize the disorders of each organ of the body, and especially the diagnostic and pathognomonic symptoms, which afford the means of discriminating between diseases that resemble each other; to determine the causes, both predisposing and exciting, by which diseases are induced; and to ascertain the modes of cure, and the nature and operation of the remedies adapted to the various circumstances and periods of diseases. *Physiology* teaches the nature of the functions of the body in a state of health; *pathology*, the various derangements of these functions which constitute disease.

PA'THOS (a violent feeling: *Gr.*), that quality of nature and art which excites the feelings of pity and sympathy.

PA'TIENT (*patiens*: *Lat.*), one who is under the direction of a physician, or other medical practitioner, for the cure of any disorder.——PATIENT, in Physiology, that which receives impressions from external agents; or whatever is passively affected.

PAT'INA (a broad dish: *Lat.*), in the Roman Catholic church, the cover of the chalice, used for holding particles of the consecrated wafer.——Also, in Numismatics, the fine rust with which coins become covered by lying in peculiar soils, and which not only preserves, but ornaments them.

PAT'OIS (*Fr.*), the dialect spoken by the lower classes.

PA'TRES CONSCRIP'TI [See CONSCRIPT FATHERS.]

PA'TRIARCH (*patriarchēs*: from *patria*, a race; and *archo*, I govern: *Gr.*) properly signifies the head or chief of a family. The name of patriarchs is generally confined to the progenitors of the Israelites who lived before Moses, Abraham, Isaac, Jacob, &c.; or to the heads of families before the flood, as the antediluvian *patriarchs*. The appellation has from hence been transferred to the bishops of the first churches of the East; as, the patriarchs of Antioch, Alexandria, Jerusalem, Constantinople.——**PATRIARCHAL CROSS**, in Heraldry, a cross appropriated to the dignity of a patriarch, as the triple crown was to that of the pope. The shaft of this cross is twice crossed, the lower transverse arm being longer than the upper.

PATRI'CIAN (*patricius*, from *patres*, fathers: *Lat.*), in Roman History, a title given at first to the descendants of the senators whom Romulus was said to have created, and called *patres*, 'fathers.' It was afterwards enjoyed by those who became senators by other means than hereditary right. But the dignity of the patricians was lessened by the fall of the republic, the civil wars, and the establishment of the imperial dignity. The word *patrician*, in its general and modern acceptation, signifies noble; senatorial, not plebeian.

PAT'RICK, ST., *Order of*, an Irish order of knighthood, instituted by George III. in 1783; and the only one belonging to Ireland. It consists of the sovereign, a prince of the blood-royal, a grand master, and fifteen knights. The lord-lieutenant of Ireland for the time being is grand master.

PATRIS'TIC (*pater*, a father: *Lat.*), in Theology, that which belongs to the fathers of the church: as *patristic theology, literature*, &c.

PAT'ROL, or **PATRO'LE** (*patrouille*: *Fr.*), in Military language, a detachment, which usually consists of from four to eight men, under a corporal. They are drawn from the posts of a garrison town, and march, at the hour appointed by the commandant, through the streets to repress disorder. On the continent, the patrol is generally accompanied by an officer of police.

PA'TRON (*Fr.*; from *patronus*, a protector: *Lat.*), in its most general sense, signifies one that specially countenances and supports another, or lends his aid to advance the interests of some undertaking; as, a *patron* of the fine arts; the *patrons* of a charitable institution, &c.——**PATRON**, among the Romans, any person in power, under whose protection inferiors placed themselves, on certain conditions of obedience and personal service. Those protected were called *clients*. The duty of the was to be their clients' counsellors in difficult cases, their advocates without payment in legal proceedings, their advisers in matters of doubt, &c. After the fall of the commonwealth, the term *patron* was still applied to the advocate who defended his client's cause for hire.——**PATRON** was also a title conferred on a master who had freed his slave, the relation of patron commencing when that of master expired. The patron was legal heir to his freed-men, if they died intestate, or without lawful issue born after their freedom commenced. By the Papian law, if a freed-man's fortune amounted to ten thousand sesterces, and he had three children, the patron was entitled to a child's portion.——**PATRON**, in the Canon and Common Law, a person who, having the advowson of a parsonage, vicarage, or other spiritual office, belonging to his manor, has the gift and disposition of the benefice, and may present to it whenever it becomes vacant.——**PATRON**, in the church of Rome, a guardian or saint, whose name a person bears, or under whose protection he is placed, and whom he invokes; or a saint, in whose name a church or order is founded.——**CARDINAL PATRON**, the prime minister of the pope.

PA'TRONAGE (from same), the right of presentation to livings.——*Lay patronage*, a right attached to a person either as founder or as heir of the founder, or as possessor of the fee to which the patronage is annexed. *Ecclesiastical patronage* is that which a person is entitled to by virtue of some benefice which he holds. In the church of Scotland, the right of presentation to livings has been at various times the source of serious disputes; and disregard, in one or two instances, of the expressed wish of the parishioners, was the cause of the great secession from the Scottish kirk, which took place in 1843. But, by Lord Aberdeen's act, the right of the members of the church to have, within certain limits, a voice in the nomination of their pastors, was acknowledged.——**ARMS OF PATRONAGE**, in Heraldry, those arms on the top of which are some marks of subjection and dependence.

PATRONYM'IC (*patronumikos*, from *pater*, a father; and *onoma*, a name: *Gr.*), a term applied to such names of men and women as are derived from those of their parents or ancestors; as *Tydides*, the son of Tydeus.

PAULIC'IANS, in Ecclesiastical History, a branch of the ancient Manichees, so called from their founder, Paulus, an Armenian. For several centuries they suffered great persecution, and were at length wholly exterminated.

PAUL'S, ST. This beautiful cathedral, built upon an eminence in London to the north of the Thames, was completed in thirty-five successive years, under one architect, Sir Christopher Wren; one master mason, Thomas Strong; and one bishop of London, Dr. Henry Compton. The first cathedral which occupied this site is, without much authority, supposed to have been built on the foundation of a temple of

Diana. It was burned down in 1066. The structure which succeeded was commenced immediately; and, its choir having been consumed by fire in 1135, it was consecrated in 1240, and entirely completed in 1315, having been 225 years in building. Its steeple was destroyed by lightning in 1443, but was rebuilt; and the church was, to a great extent, burned in 1631; repairs were commenced in 1663, but were interrupted by the civil wars; and it was totally consumed by the conflagration of 1666. The first stone of the present building was laid June 21st, 1675, and it was finished in 1710; having cost 736,752*l.* 2*s.* 3¼*d.* It is of Portland stone, in the form of a cross; its length is 500 feet from east to west; its width, 223 feet from north to south; and its height, 340 feet. The weight of the ball is 5600 lbs., and that of the cross 3360 lbs. The height to the cross from the centre of the floor is 404 feet, and the ascent to the cross is by 616 steps. It stands on a plot of more than two acres, and the iron balustrade round the church-yard is three furlongs and one-fifth in length. Two rows of massy piers divide the interior into a nave and side aisles. The west front towards Ludgate-street, forming the grand entrance, has an elevated portico of twelve Corinthian columns, with an upper portico of eight pillars of the Composite order, supporting a triangular pediment, having an entablature representing, in relief, the conversion of St. Paul. The dome is the most remarkable object in the view of London.

PAU'PERISM (*pauper*, a poor man: *Lat.*). See POOR LAWS.]

PAUSE (*pauo*, I make to cease: *Gr.*), in Music, a character denoting a cessation of sound. It is longer than a common rest, which is, in length, equal to some note; and lasts during the time of one, two, or more bars.

PAVAN' (*pavo*, a peacock: *Lat.*), a slow and stately dance, which was formerly practised in England, but is now confined to Spain. It derived its name from the peculiar dresses of the dancers, which produced a fancied resemblance to the tail of a peacock.

PA'VEMENT (*pavimentum*, from *pavio*, I strike; *Lat.*), a floor or covering consisting of stones, bricks, or other suitable material, laid on the earth in such a manner as to make a hard and convenient surface for horses, carriages, or foot-passengers.——Pavements of lava, with elevated side-walks, are found at Herculaneum and Pompeii; but the earliest paved streets of which any account has come down to us are those of Cordova, in Spain, which was paved with stones so early as the middle of the 9th century. London, it is said, was not paved till the 12th century, and then only very partially; nor was it until five more centuries had passed away that this kind of street accommodation was by any means general. Experiments have been tried with metal, wood, asphalte, &c., but stone pavement has yet retained its place, where macadamizing has not superseded it. If the traffic is very great, it seems superior in durability and economy to every other contrivance.

PAVIL'ION (*pavillon*: *Fr.*), in Architecture, a kind of turret or building, usually insulated and contained under a single roof, which is often in the form of a dome. Sometimes a pavilion is a projecting part in front of a building, and sometimes it flanks a corner; it is usually higher than the other portions. Summer-houses in gardens are often called by this name; but improperly. ——In Military affairs, a tent raised on poles.

PA'VO (a peacock: *Lat.*). [See PEACOCK.]

PAY'MASTER OF THE FOR'CES. The office of this functionary was formerly very lucrative, as he had the interest of large sums left in his hands for a considerable time. He was, *ex officio*, a privy councillor, and sometimes in the cabinet; but the duties were annexed, a few years ago, to another post, and the office no longer exists.

PEA (*pisa*: *Sax.*; from *pisum*: *Lat.*), in Botany, a plant and its fruit, of the genus *Pisum*; cultivation has produced many varieties. It has been cultivated from remote antiquity, and forms one of the most valuable of culinary vegetables, being nutritious, especially when green, in which state it forms an agreeable article of food. This plant has a papilionaceous flower, and the pericarp is a legume, called in popular language a *pod*. Peas are sometimes ground into flour, and mixed with that obtained from wheat, but the bread is rendered heavy and unwholesome. In the plural we write *peas* for two or more individual seeds, but *pease* for an indefinite number in quantity or bulk.

PEACE (*paix*: *Fr.*), in a political sense, freedom from war with a foreign power, or from internal commotion. Also that quiet, order, and security which is guaranteed by the laws. This latter is termed the *peace of the king*, and consists in that security, both of life and goods, which the sovereign promises to all his subjects, or others who are under his protection; such is the peace of the king's highways, which consists in freedom from all annoyance and molestation.

PEACH (*pêche*: (*Fr.*), in Botany, a tree and its fruit, of the genus *Amygdalus*. There are several species, and by cultivation a great number of varieties have been obtained. It belongs to the natural family *Rosaceæ*; the leaves are alternate, simple, lanceolate, acute, and finely serrated; the flowers appear before the leaves, are very beautiful, and diffuse an agreeable odour. The fruit is a large downy drupe, containing a stone that is deeply furrowed and rough externally, which character distinguishes it both from the almond and the apricot. It originally came from Persia, but it was not introduced into England till about the year 1560.

PE'ACOCK, a beautiful genus of gallinaceous birds, originally natives of India. It includes only the common peacock (*Pavo cristatus*), and the Javanese peacock (*Pavo Javanicus*). The name properly belongs to the male, but it is popularly applied to the species in general; though the female is, for distinction's sake, called a *peahen*. Like other domesticated birds, the common peacock exhibits several varieties. The ordinary length of this splendid bird, from the tip of the bill to that of the full-grown fan-expanded tail, is about four feet. The female is rather less; and her train is not only very short, but destitute of those brilliant hues and striking beauties which adorn the male, her crest, too, is less developed, and her whole plumage partakes of a cinereous hue. When pleased, the peacock erects his tail, unfolds his feathers, and frequently turns round, as if to catch the sunbeams in every direction, accompanying this movement with a hollow murmuring. At other times his cry is very disagreeable, and often repeated, especially before rain. Every year he sheds his plumes, and courts the most obscure retreats till the returning spring renews his lustre. The Javanese peacock resembles the common kind, but has a larger crest.

PEAR (*pera: Sax.*), the fruit of the *Pyrus domestica*, a tree growing wild in several parts of Europe, but of which many kinds are cultivated in all temperate climates.

PEARL (*perle: Fr.*), in Natural History, a hard, white, shining body, usually of a globular, but sometimes of a pyriform shape. It is formed by certain bivalve molluscs, belonging to different genera. The oriental pearls of commerce are obtained from the *Meleagrina margaritifera*, and other species of shellfish called 'pearl oysters.' Pearls consist of concentric layers of a fine compact nacre, or substance identical with that which lines the inside of the shell, the layers being alternately membrane and carbonate of lime. It is this structure which occasions the play of light called pearly iridescence. They are sometimes found free, and detached from the lobes of the mantle; but are most usually adherent to the nacrous coat of the shell, which, on that account, is termed *mother of pearl*. They are the consequence of a disease in the fish, caused by the introduction of foreign bodies within the shells. Pearls were held in the highest estimation by the ancients, with whom they were of an enormous price. In modern times their value is greatly lessened —it is probable, by the very beautiful imitations which may be obtained at a trifling cost. When pearls are very small, they are termed *seed-pearls*. The seas about the East Indies and America yield pearl-fish in great abundance; and they are found with good pearls in several parts of Europe. In the east, the coasts of the island of Ceylon and the Persian gulf are the localities most celebrated for pearl fisheries; and in the west, the coast of Terra-firma and the gulf of Mexico. The European pearls are chiefly found in rivers of Scotland and Bavaria. These are the produce of mollusca belonging to the genus *Unio*. The worth of a pearl is in proportion to its magnitude, roundness of form, polish, and clear lustre. Sometimes, but very rarely, a pearl is found as large as a nutmeg. One of the most remarkable pearls of which we have any authentic account is that mentioned by Tavernier; it was obtained at Catifa, in Arabia, a fishery famous in the days of Pliny, and cost the enormous sum of 110,400*l.* It was pear-shaped, regular, and without blemish; it was from two to three inches long, and nearly one inch in diameter. Even in antiquity, pearls were an object of luxury. One worth about 84,000*l.* of our money is said to have been dissolved by Cleopatra at a banquet, and drunk off to Antony's health. The largest known pearl now in existence is in the Hope collection. It is two inches long and four in circumference, and weighs 1800 grains.——*Artificial pearls* are small globules or pear-shaped spheroids of thin glass, perforated with two opposite holes, through which they are strung, and mounted into necklaces, &c., like real pearl ornaments. The liquor employed to imitate the pearly lustre is called *essence d'orient*, which is prepared by throwing into water of ammonia the brilliant lamellæ separated, by washing and friction, from the scales of the *bleak*, a small river fish. The ammonia renders them sufficiently soft and flexible to adhere closely to the inner surface of the glass, and passes off by the drying. The French are particularly successful in this manufacture. There are various other methods of imitating pearls, in which also the French are said to excel.

PEARL'-ASH, a fixed alkaline salt, prepared chiefly in America, Germany, Russia, and Poland, by dissolving out the salts contained in the ashes of burnt wood, evaporating the solution to dryness, and calcining the residue for a considerable time in a furnace moderately hot. Pearl-ashes are much used in the manufacture of glass, and, for that purpose, require no preparation, except when very great transparency is desired.

PEAT (*pyt: Isl.*), a congeries of decayed vegetable matter, generally including trunks of trees, leaves, fruits, stringy fibres, and the remains of aquatic mosses. In most cases, the plant which chiefly forms the peaty matter is a small moss, the *Sphagnum palustre*. It continues growing upwards from the points of the shoots, while decay is advancing in a similar manner from their lower extremities, a thick close mass of vegetable substance, which rots below as it forms above, being produced. The rotten part is peat or turf. It occurs in extensive beds, called *peat-mosses*, occupying the surface of the soil, or covered to the depth of a few feet with sand, gravel, &c. It is the common fuel of large districts of Wales and Scotland, and of some parts of England where coals are very dear. It constitutes the fuel of a large part of Ireland, where it covers thousands of acres. When powerfully compressed, it forms a dense and excellent fuel, the more valuable for many purposes since it contains no sulphur.

PEB'BLES (*pæbol: Sax.*), round nodules, particularly of siliceous minerals, such as rock-crystal, agates, &c.——The term is used by opticians to express the transparent and colourless rock-crystal or quartz, used as a substitute for glass in spectacles; its hardness makes it little likely to be scratched.

PEC'CARY, the name of two South American animals allied to the hog, but distinguished by the absence of the outer toe of the hind foot, and the presence of a peculiar gland, which exudes its secretion by an orifice situated in the back: whence Cuvier devised the name of *Dicotyles* (two navels) for the genus. The collared peccary (*Dicotyles torquatus*), and the white lipped peccary (*Dicotyles labiatus*), are the only known species.

PECH'BLEND, or **PITCH'BLEND**, in Mineralogy, ore of uranium; a metallic substance of a blackish or deep iron-grey colour, sometimes spotted with red; it is found in masses in Swedish and Saxon mines, and is generally stratified with other minerals.

PECK, a dry measure of eight quarts, being the fourth part of a bushel. The imperial peck contains 554·55 cubic inches.

PEC'TEN (a comb: *Lat.*), a large genus of *Conchifera*, bivalve mollusca, whose shells have a hinge like that of the oyster, but usually marked with ribs which radiate from the summit of each valve to the circumference, and furnished with two processes called ears. Pectens obtain their name from the ribs or ridges of their shells running in straight lines like the teeth of a comb. They are commonly called clams. The scallop (*Pecten maximus*) and quin (*P. opercularis*) are esteemed delicacies; the latter covers extensive banks, especially on the N. and W. of Ireland. The body of the scallop is bright orange or scarlet; the shell is used for 'scalloping' oysters; formerly it was used as a drinking cup, and celebrated as such in Ossian's 'Hall of Shells.' An allied species has received the name of St. James's shell (*P. Jacobæus*): it was worn by pilgrims to the Holy Land, and became the badge of several orders of knighthood.

PEC'TIN (*pēktos*, thick, as opposed to liquid: *Gr.*), the gelatinizing principle of certain vegetables, such as currants, apples, &c. It may be obtained abundantly from some esculent roots—carrots, for example, which, on this account, are so useful as ingredients in soup. Pectin, or *pectic acid*, is in the form of a jelly, which affords insoluble compounds with the earths and several other metallic oxides.

PEC'TINATED, or **PEC'TINATE** (*pectinatus*, from *pecten*, a comb: *Lat.*), in Natural History, an epithet for anything which is toothed like a comb.——A mineral is said to be *pectinated*, when it presents short filaments, crystals, or branches, nearly parallel and equidistant.

PEC'TORAL (*pectoralis*, from *pectus*, the breast: *Lat.*), an epithet for whatever relates to the breast; hence *vectoral* fins, the anterior and lateral fins, which represent, in fishes, the fore-legs or anterior members of other vertebrates.

PEC'ULATOR (*Lat.*), in Roman Law, a public officer who embezzled the public money.

PECU'LIAR (*pecularis*, special: *Lat.*), in Ecclesiastical Law, an exempt jurisdiction, which is not under the ordinary of the diocese. Peculiars are royal, of which the king is ordinary: those of archbishops, bishops, deans, chapters, &c.——COURT OF PECULIARS, a branch of the court of arches belonging to the archbishop of Canterbury, which takes cognizance of matters relating to parishes that have a peculiar jurisdiction.

PED'AGOGUE (*paidagōgos*: from *pais*, a child; and *agōgos*, a leading: *Gr.*), a slave of a superior order, to whom a child was intrusted from about the age of seven till he became a youth, by the Greeks and Romans, particularly the former. To him was committed the charge of giving instruction in the inferior branches of education, and he accompanied his pupil to the masters who taught the other branches.

PED'ALS (*pedalis*, pertaining to the foot: *Lat.*), in Music, the keys which are played by the feet, and by which the deepest bass pipes of an organ are sounded. It is worthy of notice that England, which was the first to introduce the organ into churches generally, was the last to adopt the obvious improvement of pedals. A pedal is also attached to a piano to strengthen and prolong the tones. In a harp, the pedal serves to elevate the notes half a tone; and it is used for a variety of other purposes in musical instruments, such as coupling and drawing stops, swelling, blowing a bellows, &c.

PED'ATE (*pes*, a foot: *Lat.*), in Botany, an epithet applied to a palmate leaf, having the two lateral lobes divided into smaller segments, the midribs of which do not run directly into the common central point.

PED'ESTAL (*piédestal*: *Fr.*), in Architecture, the lowest part of a wall or column, being that which serves as its stand. It consists of three parts, a trunk or *dye*, which forms the body; a *cornice*, which forms the head; and a *base*, which forms the foot.

PED'ICLE (*pediculus*, the *dim.* of *pes*, a foot: *Lat.*), in Botany, the ultimate division of a common peduncle.

PEDIC'ULUS (*Lat.*), in Entomology, a genus of parasitic apterous insects, commonly termed lice in the order *Anophera*. There are many species, some of which infest quadrupeds, some birds, and some human beings.

PED'IMENT, in Architecture, a kind of low pinnacle, which serves to complete a frontispiece, and which finishes the fronts of buildings, or is placed as an ornament over gates, doors, windows, or niches. The pediment is ordinarily angular, but sometimes it forms the arc of a circle, or some other curve. The parts of a pediment are—1. the tympanum, or central triangular part; 2. the cornice, which crowns it; and 3. the entablature, which serves as its base. The tympanum is often decorated with sculpture.

PEDOM'ETER (*pes*, a foot: *Lat.*; and *metron*, a measure: *Gr.*), an instrument by which paces are numbered, and the distance from place to place ascertained. It also marks the revolutions of carriage-wheels, This is done by means of wheels with teeth and a chain or string fastened to the foot, or to the carriage-wheel; and the wheels advance a division at every step, or at every revolution. The instrument is generally in the form of a watch.

PEDUN'CLE (a *dim.* from *pes*, a foot: *Lat.*), in Botany, the stem or stalk that supports the fructification of a plant, and of course the fruit. A *pedunculate* flower is one which grows on a peduncle.

PEER (*pair: Fr.; from par*, equal: *Lat.*), a nobleman of the realm. The lords of parliament are the peers of each other; for, whatever formality or precedence may attach to the title of duke, marquis, earl, or viscount, it is a *barony* which conveys the right to a seat in parliament, and confers every privilege annexed. It is as a baron, not as a duke, bishop, &c., that a peer sits in parliament; and the parliamentary rights are, at the present day, the essence of nobility. In compliance with an ancient practice, peers are sometimes still created by titles which convey the idea of local rights to which they have in reality no pretension; but though this is a mere form, the rank they gain is not an empty one; it is that of an hereditary legislator of the realm. A peer is not to be put upon any inquest, even though the cause have a relation to two peers; and where a peer is defendant in a court of equity, he is not to be sworn to his answer, which is to be received upon the faith of his honour; but when he is to answer to interrogatories, or to make an affidavit, or to be examined as a witness, he is to be sworn. A peer is free from arrest, in civil cases, at all times. [See PARLIAMENT.] *Trial of a Peer.* It is a maxim of the first importance, that those public men who, in a free country particularly, will always be liable to the dangers of political animosity, should be secured against possible popular injustice; and for this reason, as well as because, with the rest of his fellow-subjects, he claims to be tried by his equals, a peer must be arraigned, whether on a charge of treason or of felony, before the house of which he is a member. After the evidence for the prosecution and the answer have been heard, the lord high-steward openly demands of each lord whether the prisoner, calling him by his name, is guilty of the crime for which he is arraigned; and each lord, laying his right hand upon his left breast, separately answers, 'Guilty,' or 'Not Guilty, upon my honour.' If, by a majority of votes, the prisoner be found guilty, he is brought to the bar again; the high-steward acquaints him with the verdict of his peers, and passes sentence and judgment accordingly; or, acting as he does by commission, the high-steward may take time to advise upon the judgment, and his office continues till that is passed. The appointment of a high-steward only takes place when the parliament is not sitting; and the trial is said to be in the *court of the high-steward of England.* The peers officiate at once as jurors and judges; their speaker collects the votes: and the trial is said to be in the *high court of parliament.* In mere misdemeanors, a peer is tried, like a commoner, by a jury. There are two peculiarities attending the trial of a peer: 1st, the number of jurors is greater than ordinary, every peer having a right to sit; 2ndly, unanimity is not required, but the decision depends upon the majority, which, however, must amount to twelve.

PEER'ESS, a woman who is noble by descent, creation, or marriage. If a peeress by descent or creation marries a person under the degree of nobility, she still continues noble; but if she has obtained the dignity by marriage only, she loses it by a subsequent marriage with a commoner, though, by the courtesy of England, she always retains her title. A peeress, though she cannot sit in parliament, has the privileges of a peer; she cannot be arrested for debt or trespass, and must be tried by her peers.

PEG'ASUS (*Lat.*), in Astronomy, a constellation in the northern hemisphere. It derives its name from *Pegasus*, the winged horse, which, according to some, sprang from the blood of the Gorgon Medusa, after Perseus, a son of Jupiter, had cut off her head. The Greeks probably derived the idea of a winged horse from the Assyrians, amongst whose sculptures the figure has been found.

PEINE FORTE ET DURE (violent and severe pain: *Fr.*). [See QUESTION.]

PELA'GIANS, a Christian sect who appeared about the beginning of the 5th century. Pelagius, the founder of it, was born in Wales, and his real name was Morgan, which in the Welsh language signifies *sea born;* whence the Latin name Pelagius. Augustine gives him the character of a very pious man, and a person of superior birth. Among other peculiarities, the Pelagians denied original sin, maintaining that Adam would have died whether he had sinned or not; that we derive no corruption from his guilt; that our own powers are sufficient for our justification; that by free will we fall into sin, and by the voluntary exercise of the same will we may repent and reform, the immediate operation of the Holy Spirit not being necessary to awaken a religious feeling, or to assist us towards perfection. Augustine strongly opposed the teaching of Pelagius, and succeeded in having it rejected by the great majority of the church. But there afterwards arose another sect, the Semi-Pelagians, which spread much more widely. This was originated by Cassianus, an eastern monk, who taught that man has no need of internal preventing-grace; that the natural powers of man are sufficient to begin the renovation of his soul, and that he can have faith and a purpose of living holily, although he requires divine assistance and grace to enable him to persevere. Controversies concerning the nature and mode of divine grace necessary for salvation then commenced, and have never ceased to agitate the church.

PEL'ICAN (*pelekan: Gr.*), a web-footed bird larger than a swan, inhabiting marshy and uncultivated places, particularly islands and lakes where sedges abound. The bill is straight, except at the point, and it has a skin reaching down the neck, which forms a pouch capable of being distended so as to be very capacious. There are several species; the common pelican is an inhabitant of the eastern part of Europe and Africa.

The female pelican has a peculiar tenderness for her young, and feeds them with fish that have been macerated for some time in her pouch; hence has arisen the fabulous story of her feeding them by drawing blood from her breast. Pelicans are gregarious, very fond of fish, and, when harassed or pursued, readily reject the contents of their stomach, like the gull tribe

PELLA'GRA (*pella*, the skin; and *agra*, a catching: *Gr.*), in Medicine, the name given to a disease, or complication of diseases, common to the inhabitants of the Lombardo-Venetian plains It is a species of *elephantiasis;* it begins by an erysipelatous eruption of the skin, and is frequently accompanied by remarkable lassitude, melancholy, moroseness, and hypochondriasis, with an evident propensity to suicide It is almost confined to the agricultural population and the poorest classes

PEL'LICLE (*pellicula*, the *dim.* of *pellis*, a skin. *Lat*), any thin skin, whether animal or vegetable; also the skin which forms on the surface of some evaporating liquids

PEL'LITORY, the name of several plants of different genera Of these the root of the *Anthemis Pyrethrum*, a composite plant, termed *Pellitory of Spain*, has a pungent flavour, when chewed it promotes the flow of saliva, and is often useful in the toothache The *Pellitory of the wall* is a species of *Parietaria*, a common weed on walls

PELLS (*pellis*, a skin. *Lat* - from the parchments used), CLERK OF THE, an officer of the English exchequer, who enters every teller's bill on the parchment rolls, the roll of receipts, and the roll of disbursements.

PEL'TA (*Lat*; from *peltē*: *Gr*), in Antiquity, a small, light, and manageable buckler.-- In Botany, a term used in describing lichens, to denote a flat shield, without any elevated rim, as in the *Peltideæ*

PEL'TATE (from last), in Botany, a leaf or any other organ fixed to a stalk by the centre, or by some point distinctly within the margin.

PEL'TRY (*pelz*: *Ger*; from *pellis*, a skin: *Lat.*), the skins of different kinds of wild animals found in high northern latitudes, such as the beaver, sable, wolf, &c., before they have received any preparation. If the inner side has been tanned by an aluminous process, they are termed *furs*.

PEL'VIS (*Lat.*), the cavity formed by the hip bones. Each side of the pelvic arch is composed of three bones, which are soldered together in the adult, and form the *os innominatum* of the anatomist. The largest of these is the *ilium*, which is united to that portion of the vertebral column called the sacrum; the middle bone is the *ischium*, and the lowest the *pubis*, which joins its fellow on the opposite side, and forms as it were the crown of the arch.

PEM'ICAN, a preparation of reindeer venison used by traders and hunters in British North America. The meat is first dried, and after being pounded is mixed with fat, generally the suet of the bison. It is then sewed up in a bag of undressed hide with the hairy side outwards.

PEN (*penna*, feather: *Lat.*), an instrument used for writing, made either of the quill of some large fowl, of metal, or of any other material. In ancient times, reeds were split and shaped to a point similar to our pens; and quills are supposed not to have been employed for writing till the 6th century. Metallic pens were first made in 1803, but they were not used to any extent until about the year 1830. In manufacturing them, the steel is pressed into thin sheets, then cut into slips, annealed for fourteen hours, and again passed under the roller. By means of a peculiar cutting-machine, the pens are formed in a falchion shape. The preparation for making the slit then takes place. An extremely fine-edged chisel is brought down upon each pen separately, and is allowed to penetrate two-thirds through its substance. A piece is next cut out at the upper end of the slit, which is called *piercing*. The proper shape is given by means of a punch fitting into a corresponding concavity. The pens are then heated red-hot and dipped into oil, and afterwards polished by a peculiar apparatus, in which they are placed, and to which a motion is given resembling that required in shaking together materials in a bag. After this they are tempered in a box, and brought to a blue colour, being carefully watched, and the heat being lessened whenever a shade of yellow is observed on their surface. The slit is now completed by touching its side with a pair of pincers The process varies a little in different manufactories, but the principles on which it is conducted are very similar in all. Pens are sometimes made or tipped with other metals, to prevent rapid corrosion or wear; but the mode of manufacture remains almost the same.——FOUNTAIN PEN, a pen made of silver, or other metal, so contrived as to contain a considerable quantity of ink. This, flowing out by gentle degrees, supplies the writer a long time without his being under the necessity of taking fresh ink.

PE'NAL LAWS (*pœnalis*, belonging to punishment: *Lat.*), laws made for the punishment of criminal offences. The term is understood specially to comprehend those which were enacted to prevent the practice of the Roman Catholic religion, in consequence of its being considered incompatible with civil and religious liberty. After many of them had been from time to time relaxed or repealed, all restrictions and disabilities, except those regarding a few offices with which the safety of the established church is intimately connected, were removed by the *relief bill* passed in 1829.

PEN'ALTY (*pœna*, punishment: *Lat.*), a fine or forfeiture, by way of punishment; it includes imprisonment, whipping, &c.

PEN'ANCE (same *deriv*), in Ecclesiastical Law, the infliction of some pain or bodily suffering, as fasting, flagellation, &c.; or an exercise of repentance for some sin, either voluntary or imposed. It relates more especially to sufferings of the body, as *penitence* or *repentance* does to the regrets and sorrows of the mind. *Penance* is one of the seven sacraments of the Roman Catholic church.

PENA'TES (*Lat.*), in Roman Antiquity, tutelar deities, either of countries or of particular houses, in which last sense they were the same with the *Lares*.

PEN'CIL (*penicillum : Lat.*), a small brush used by painters for laying on their colours. Pencils are of various kinds, sizes, and materials; the larger kinds are made of swine's bristles, the thick ends of which are bound to a stick or handle, and, when very large, are called *brushes*. The finer are made of the hair of camels, badgers, and squirrels, and of the down of swans; these are tied at the upper end, and enclosed in a quill. All of the latter kind, when good, on being drawn between the lips, come to a fine point.——BLACK-LEAD PENCILS, slips of black lead (plumbago or graphite), enclosed in cylindrical or prismatic pieces of cedar, and pointed at one end. They are of different sizes and qualities, according to the purposes for which they are intended *Ever-pointed* pencils are merely very slender cylinders of black lead so placed in metallic or other cases, that they can be screwed out at pleasure: the points being protected when out of use, and never requiring to be cut.——PENCIL OF RAYS, in Optics, a number of rays diverging from some luminous point, which, after falling upon, or passing through a lens, converge again to a point.

PEN'DANT (*pendo*, I suspend : *Lat.*), in Gothic Architecture, an ornamental polygonal piece of stone or timber, hanging down from a vault or the roof of a building. Some exquisite pendants of this kind are to be seen in the chapel of Henry VII. at Westminster. The springers of arches, which rests on shafts or corbels, are also sometimes called *pendants*.—— In Heraldry, a part hanging from the label, resembling the drops in the Doric frieze.——PENDANT, in Nautical language, a long narrow flag or streamer displayed from the ship's mast-head, and usually terminating in two points. It denotes that a ship is in actual service. The *broad pendant* is a flag that serves to distinguish the chief of a squadron.——The *rudder pendant* is a rope made fast to the rudder by a chain, to prevent the loss of the rudder when unshipped.——Also, an ornament or jewel hanging at the ear.

PEN'DENTIVE (*pendens*, hanging down : *Lat.*), in Architecture, that portion of a vault which descends into an angle between the arches, when a dome springs from a straight-sided area. A circular dome may, by means of pendentives, be formed over any regular polygon.

PEN'DULUM (*pendulus*, hanging down : *Lat.*), in Dynamics, a ponderous body so suspended that it may vibrate, or swing backwards and forwards, from some fixed point, or axis of suspension. The vibrations of a pendulum are called its *oscillations*, and depend on the force of gravity. From the precision of its motions, it is employed in measuring time and space. The origin of the pendulum is traced to Galileo's observation of a hanging lamp in a church at Pisa continuing to vibrate long, and with singular uniformity, after any accidental cause of disturbance. He was induced to investigate the laws of this phenomenon, which led to results in the highest degree important. To render a pendulum perfectly isochronous, it must be made to vibrate in a cycloidal arc; but, practically, it is sufficient if the arc of vibration is small, and the pendulum heavy. A common clock is merely a pendulum, with wheel-work attached to it, to record the number of the vibrations; and with a weight or spring, having force enough to counteract the retarding effects of friction and the resistance of the air. The wheels show how many swings or beats of the pendulum have taken place, because, at every beat, a tooth of the last wheel is allowed to pass. Now, if this wheel has sixty teeth, as is common, it will just turn round once for sixty beats of the pendulum, or seconds; and a hand fixed on its axis, projecting through the dial-plate, will be the second-hand of the clock. The other wheels are so connected with this first, and the numbers of the teeth on them so proportioned, that one turns sixty times slower than the first, to fit its axis for carrying a minute hand; and another, twelve times lower still, to fit its axis for carrying an hour-hand. The pendulum has been successfully used to measure the force of gravity at different parts of the earth; the greater this is, the greater the length of a pendulum which will vibrate at a given rate. At Spitzbergen, the length of a pendulum vibrating seconds is 39·21469 English inches, at the Cape of Good Hope, 39·078. The pendulum is affected by temperature [See COMPENSATION PENDULUM.]

PEN'DULUM EXPER'IMENT. M. Foucault, of Paris, pointed out a mode of rendering the rotation of the earth *perceptible*, by means of a pendulum. A simple pendulum, if made to oscillate, may be carried in any direction round a room, without the planes in which the oscillations take place ceasing to be parallel to themselves. Hence, if a pendulum were made to vibrate at either pole, the terrestrial meridians would successively pass under it, and it would *appear* to describe an entire circle in 24 hours. When the experiment is made in any place between the pole and equator, the effect is similar, though modified; and the time of rotation will be increased, by the ratio of the cosecant of the latitude to radius. The experiment may be made in a rude, but sufficiently satisfactory manner, by suspending a ball of metal, or other heavy body, from the ceiling of a lofty room, by a cord long enough to make it almost touch the floor, and setting it in vibration, a line having been previously chalked immediately under the plane of vibration. This pendulum will soon leave the chalked line, and the line over which it vibrates will seem to revolve on its centre.

PENETRA'LE (*Lat.*), a sacred room or chapel in private houses, set apart for the worship of the household gods among the Romans. In temples also there were *penetralia*, or apartments of particular sanctity, where the images of the gods were kept, and certain solemn ceremonies performed.

PEN'GUIN (*pinguis*, fat : *Lat.*), the name of web-footed birds belonging to the Auk family. They are found only in southern latitudes, and have very remarkable peculiarities. They have very short legs, with four toes, three of which are webbed; the body is clothed with short feathers, set as compactly as the scales of a fish; the wings are small, like fins, and covered with short scale-like feathers, so that they are useless in flight. When on land, penguins stand erect, but some species when moving use their little wings as front legs, crawling on all fours so rapidly that seen from a distance they may be mistaken for a quadruped. They are tame, and may be driven like a flock of sheep; but they seldom go on shore, except in the breeding season. In water they swim with rapidity, their fin-like wings greatly assisting them. Their name is derived from their extreme fatness.

PENIN'SULA (*Lat.*; from *pene*, almost; and *insula*, an island), a portion of land, surrounded by the sea, except where it joins the mainland by a narrow neck called an *isthmus*. In Europe it is common to designate Spain and Portugal by the appellation of *the peninsula*; and when we speak of the contest maintained by the British and native troops against the French, we accordingly term it the *peninsular war*.

PENITEN'TIARY (*pœnitentia*, repentance: *Lat.*), a prison where convicts are subjected to instruction and discipline. Imprisonment for crime may be either for prevention and punishment only, or for the reformation of the offender also. An attempt to reform can scarcely have place when the period of incarceration is short. It is usual not to commence the system of reformation until the criminal has suffered in this country one, and in other countries two years' punishment. Great evils have been found to arise from prisoners feigning reformation, where no reformation has occurred, and the authorities in such cases allowing themselves too easily to be imposed upon; and from punishments being relaxed or altogether terminated, with too great facility, in cases of pretended reformation. The penitentiary at Millbank is fitted up for 800 males and 400 females.——GRAND PENITENTIARY, at the court of Rome, an officer appointed to absolve in cases reserved to the pope; also to grant secret bulls, &c., in cases of conscience. Roman Catholic bishops appoint penitentiaries in their dioceses, for the absolution of cases otherwise reserved to themselves.

PEN'ITENTS (*pœnitentes*, persons repenting: *Lat.*), an appellation given to certain fraternities in Roman Catholic countries, distinguished by their different habits; and of which there are a great variety in France, Spain, Italy, &c.

PEN'NON (*Fr.*), in Heraldry, a small pointed flag, borne in former times by a gentleman. When knighthood was conferred upon him, the point was cut off, and the square flag that remained obtained the name of *banner*.

PEN'NY (*pfennig*: *Ger.*), an ancient silver coin, which was the only one current among our Saxon ancestors; but now a copper coin, twelve of which are equal to a shilling. In Ethelred's reign the penny was the twentieth part of an ounce troy: hence the denomination *pennyweight*. Till the time of Edward I. the penny was struck with a cross so deeply sunk into it that it might, if required, be easily broken, and parted into halves and quarters; hence the terms *half-pence*, and *farthings* (fourth-things) or *quadrantes*. Edward I. required that the silver penny should weigh the twentieth part of an ounce. Queen Elizabeth reduced it to the sixty-second part.

PEN'NYWEIGHT, a troy weight, containing 24 grains, each of which is supposed to be equal in weight to a grain of wheat gathered out of the middle of the ear, and well dried. It was the weight of a silver penny in the time of Edward I.

PEN'SIONER (*pensio*, a payment: *Lat.*), one who receives an annuity from another; whether in consideration of service past or present, or merely as an act of kindness. In the university of Cambridge the *pensioners* form the great body of the students; they pay for their commons and chambers, and usually enjoy no pecuniary advantages from their colleges.——*The Band of Gentlemen Pensioners*, the former designation of the *Band of Gentlemen-at-arms*, a body of forty gentlemen who attend the sovereign at levees, drawing-rooms, and other state occasions. It was instituted by Henry VII., and their duty is to guard the royal person to and from the chapel royal, &c.; for which each receives a pension or annual allowance of 100*l*.——*Pensions of the Inns of Court*, annual payments made by each member to the society.

PENTACAP'SULAR (*pente*, five: *Gr.*; and *capsula*, a small box: *Lat.*), in Botany, an epithet for a plant having five capsules or seed vessels.

PEN'TACHORD (*pente*, five; and *chordē*, a string: *Gr.*), a musical instrument with five strings.

PENTACRI'NUS (*pente*, five; and *krinon*, a lily: *Gr.*), a genus of marine animals, allied to the star-fishes, of which only a single living species is known, viz. the *P. Caput-Medusæ*, of which a few specimens have been found in the West Indies. On the top of a long column formed of a number of calcareous plates, held together by animal matter, is a disk that has ten arms, each of which branches into three. The mouth is placed at the middle of the disk. In the lias formation several species have been found fossil, and these are called Encrinites or stone lilies. The skeleton of one of these contained 150,000 pieces.

PEN'TACOCCOUS (*pente*, five; and *kokkos*, a kernel: *Gr.*), in Botany, an epithet implying that the plant has five united cells with one seed in each.

PEN'TAGON (*pente*, five; and *gōnia*, an angle: *Gr.*), in Geometry, a plane figure having five sides and five angles. If the five sides are equal, it is called a regular pentagon. Its area is equal to five times the sine of 36° multiplied by the cosine of the same; and the square of the side of a regular pentagon is equal to the sum of the squares of the sides of the hexagon and decagon inscribed in the same circle.——In Fortification, a fort with five bastions.

PEN'TAGRAPH (*pente*, five; and *grapho*, I write: *Gr.*) [See PANTAGRAPH.]

PENTAGY'NIA (*pente*, five; and *gunē*, a female: *Gr.*), in Botany, an order of plants in the Linnæan system, comprehending such as have five pistils in an hermaphrodite flower.

PENTAHE'DRON (*pente*, five; and *hedra*, a base: *Gr.*), in Geometry, a solid having five equal sides.

PENTAHEXAHE'DRAL (*pente*, five; *hex*, six; and *hedra*, a base: *Gr.*), in Crystallography, exhibiting five ranges of faces one above another, each range containing six faces.

PENTAM'ETER (*pentametros*, consisting of five measures: *Gr.*), in Latin and Greek Poetry, a verse consisting of two parts, each composed of two feet and a long syllable, which must either be a single word or a terminating syllable. The feet may be either dactyls or spondees. A pentameter verse alternating with an hexameter constitutes what is called *elegiac verse*, a verse in which Ovid excelled.

PENTAN'DRIA (*pente*, five; and *anēr*, a male: *Gr.*), in Botany, the fifth class of the Linnæan system, containing those plants which have hermaphrodite flowers with five stamens.

PENTAN'GULAR (*pente*, five: *Gr*; and *angulus*, an angle: *Lat*), in Geometry, having five corners or angles.

PENTAPET'ALOUS (*pente*, five: and *petalon*, a leaf: *Gr*), in Botany, an epithet given to flowers that consist of five petals or flower-leaves.

PENTAPHYL'LOUS (*pente*, five; and *phullon*, a leaf: *Gr.*), in Botany, consisting of, or having five leaves.

PENTAP'OLIS (*Gr.*, from *pente*, five; and *polis*, a city), a name given by the ancient Greeks to certain countries having five very important cities, the most remarkable of these was the *Pentapolis Cyrenaica*, or that of Egypt, the cities of which were Berenice, Arsinoë, Ptolemaïs, Cyrene, and Apollonia.

PEN'TASTICH (*pentastichos*, from *pente*, five; and *stichos*, a verse; *Gr.*), in Poetry, a composition consisting of five verses.

PEN'TASTYLE (*pente*, five; and *stulos*, a column: *Gr.*), in Architecture, a building in which there are five columns in front.

PEN'TATEUCH (*pentateuchos*: from *pente*, five; and *teuchos*, a book: *Gr.*), an appellation given to the first five books of the Old Testament—Genesis, Exodus, Leviticus, Numbers, and Deuteronomy.

PENTATH'LUM (*pentathlon*, from *pentē*, five; and *athlos*, a contest: *Gr.*), an appellation given by the Greeks to the five principal bodily exercises—running, leaping, throwing the quoit or discus, hurling the javelin, and wrestling. They were termed *quinquectium* by the Romans.

PEN'TECOST (*pentēkostē*, from *pentēkostos*, the fiftieth: *Gr.*), a solemn festival of the Jews, instituted in memory of the promulgation of the law, and so named because it was observed on the *fiftieth* day after the feast of unleavened bread. It was also called the *Feast of Weeks*. It is retained in the Christian church, under the name of Whitsuntide, on account of the miraculous descent of the Holy Ghost on the apostles, which happened on one of the annual returns of its celebration.

PENT'-ROOF, a roof of any building or shed, formed like an inclined plane, the slope being all on one side.

PENTEL'ICAN MAR'BLE, a stone much employed by the ancient Greek sculptors and quarried on Mount Penteles near Athens. It was of fine grain and occasionally marked with greenish spots.

PENUL'TIMA, PENULT', or PENUL'TIMATE SYLLABLE (*penultimus*, from *pene*, almost; and *ultimus*, the last: *Lat.*), in Grammar, the last syllable but one of a word; and hence the *antepenultimate* syllable is the last but two, or that immediately before the penultima.

PENUM'BRA (*pene*, almost; and *umbra*, a shadow: *Lat*), in Astronomy, a partial shade or obscurity in an eclipse, observed between the perfect shadow, where the light is entirely intercepted, and the full light It arises from the magnitude of the sun, and is that portion of space behind the object causing the eclipse, in which the illuminated body is enlightened by only a part of the disc of the illuminating body. The nearer to the umbra the darker the penumbra, and hence it is difficult, in eclipses of the moon, to determine by observation the exact time at which the eclipse begins and ends. Penumbras must be constant attendants of all eclipses, whether of the sun or moon, or planets primary or secondary.

PEPERI'NO, the name given in Italy to a volcanic tufa quarried in the neighbourhood of Rome and employed as a building stone and for works of art.

PE'PO (*pepon*, a pumpkin: *Gr*), in Botany, the name given to the fruit of cucurbitaceous plants, such as the gourd and melon, in which under the adherent calyx there is a fleshy rind, and the placentas are parietal and at least three in number.

PEP'PER (*piper*: *Lat.*), the fruit of tropical plants belonging to the genus *Piper*, nat ord *Piperaceæ* We have three kinds of pepper—the white, the black, and the long. Black pepper is the fruit of a creeping shrub (*Piper nigrum*) growing in Java, Sumatra, Ceylon, and other Asiatic countries. The berries are produced in clusters, and change as they ripen from green to red, and afterwards to black. White pepper differs from the black only in being stripped of its corticle or covering. To effect this, the black berries are steeped in salt water, and after they have been exposed to the sun for several days the chaff is rubbed off with the hands. In this operation the pepper loses much of its original hot taste Long pepper consists of the half-ripe flower-heads of *Piper longum*. Red pepper is the ground fruit of various species of *Solanum*, which see.

PEP'PERMINT, in Botany, a plant of the genus *Mentha*. It is highly aromatic and pungent. Also, an essential oil distilled from the plant.

PEP'PERMINT-TREE, the *Eucalyptus piperita*, a native of New South Wales.

PER, a Latin preposition, signifying *by*; used in many phrases, as *per force*, *per annum*, *per cent.* &c.——In Chemistry, it is a contraction for *hyper*, and is employed as a prefix to denote *very* or *fully*, or to the *utmost extent*: as in *peroxide*, which indicates a substance oxidized in the highest degree.

PERAM'BULATOR (*perambulo*, I walk through: *Lat*), an instrument for measuring distances, otherwise called a *pedometer*, which see.

PERBISUL'PHATE, in Chemistry, a sulphate which contains two proportions of sulphuric acid, and is combined with an oxide at the maximum of oxidation

PER CEN'TUM, or **PER CENT** (by the hundred · *Lat.*), the rate of interest, or so much for every hundred; as *five per cent*, that is, five pounds for every hundred pounds, five dollars for every hundred dollars, &c.

PERCEP'TION (*perceptio* · *Lat.*), in Logic, the first act of the mind, which consists in the reception of ideas concerning external objects, through the medium of the senses It has been well observed that the first objects which strike our senses give us our first ideas; and our wants are the cause of our *attention*: the repetition of these ideas, and the development of new wants, give birth to our sentiments and thoughts The eyes convey the ideas of colour, the ears those of sound, the nostrils those of odour, and the palate those of taste These have no connection with each other—they are separate ideas of different qualities of bodies; but the sense of *touch* unites the whole in *one* object, which may happen to be at the same time coloured, sonorous, odorous, and savoury

PERCH (*perche* · *Fr.*; from *perkē* · *Gr*), in Ichthyology, a freshwater fish of the genus *Perca*, with rough scales and sharp incurvate teeth, its flesh is very delicate The *sea perch* belongs to the genus *Serranus*. Both these genera fall into the large acanthopterygian family of *Percidæ*.——PERCH, or *Pole*, a measure of five yards and a half, or sixteen feet and a half The word *rod* is much more generally used than either *pole* or *perch*, though they all signify the same thing. The Irish perch is seven yards, and the measures founded on it are in proportion.

PERCHLO'RIC A'CID, in Chemistry, chlorine converted into an acid by combination with a maximum of oxygen. A compound of this acid with a base is termed a *perchlorate*.

PERCUS'SION (*percussio*, from *percutio*, I strike: *Lat*), in Mechanics, the effect which a body produces in falling or striking upon another; or the shock of two bodies, one of which is in motion If both bodies are in motion, the shock is termed a *collision*.

PERCUS'SION LOCKS, those which, in firearms, have superseded the flint locks, which succeeded matchlocks, and remained in use for so considerable a period. Percussion locks ignite the charge by first exploding a detonating mixture contained in a copper *cap* by means of the *cock*, a kind of hammer. These caps act far more certainly than the oil *priming*, which was so liable to derangement, and which caused firearms so often to *miss fire*.

PER'DU (lost: *Fr.*), in Military affairs, a term applied to any soldier who is in a dangerous post; whence *enfants perdus*, in the plural, for the forlorn hope of an army.

PERE LA CHAISE, the name of the celebrated cemetery at Paris, laid out as such in 1804. It was formerly the chief seat of the Jesuits' establishment in France, which was presided over by Père la Chaise, confessor of Louis XIV. [See CEMETERY]

PEREN'NIAL (*perennis*, literally, that which lasts through the whole year · *Lat*), in Botany, a plant which lives or continues more than two years, whether it retains its leaves or not

PER'FECT NUM'BER (*perfectus*, complete *Lat*), in Arithmetic, one equal to the sum of all its aliquot parts or divisors. Thus 6, 28, &c. [See NUMBER]

PERFO'LIATE (*per*, through; and *foliatus*, leaved. *Lat.*), in Botany, an epithet for a leaf the base of which entirely surrounds the stem transversely, so that the stem seems to have been driven through the middle of the leaf.

PERGUN'NAH, a name given to districts in India.

PE'RI In Persian Mythology, the *peris* are the descendants of fallen spirits, excluded from paradise until their penance is accomplished

PER'IANTH (*peri*, around; and *anthos*, a flower · *Gr*), in Botany, a calyx and corolla, the limits of which are undefined, so that they cannot be distinguished from each other as in the iris and lily. The perianth is termed also *perigonium*

PERIB'OLOS (*Gr*; from *periballo*, I surround), in Architecture, an enclosure round a temple, surrounded by a wall. The great temple of Palmyra is encompassed by a wall, with two rows of interior columns, each side of which is from 700 to 800 feet long.

PERICAR'DIUM (*perikardion*, from *peri*, around; and *kardia*, the heart: *Gr*)), in Anatomy, a membrane which surrounds the whole substance of the heart It contains a fluid which prevents the surface of the heart from becoming dry by its continual motion Inflammation of this membrane is termed *pericarditis*.

PER'ICARP (*perikarpion*, from *peri*, around; and *karpos*, fruit: *Gr*), in Botany, the fruit of a plant; usually separable into three layers, the *epicarp*, the skin of a peach for example, the *mesocarp*, the fleshy part of the peach, and the *endocarp*, of which the stone of the peach is an example In some fruits, such as the filbert, these three parts are blended together.

PERICRA'NIUM (*perikranion*, from *peri*, around; and *kranion*, the skull: *Gr*), in Anatomy, the membrane that closely invests the skull.

PER'IGEE (*peri*, near; and *gē*, the earth. *Gr*), an Astronomical term. [See APOGEE]

PERIG'YNOUS (*peri*, near, and *gunē*, the female: *Gr*), in Botany, an epithet for a flower in which the stamens originate from the sides of the calyx.

PERIHE'LION (*peri*, near; and *hēlios*, the sun: *Gr.*), in Astronomy, that point of a planet's orbit in which it is nearest to the sun; opposed to *aphelion*.

PERIHEXAHE'DRAL (*peri*, around; *hex*, six; and *hedra*, a base: *Gr.*), in Crystallography, a term designating a crystal, whose primitive form is a four-sided prism, which in the secondary form is converted into a prism of six sides.

PERIM'ETER (*perimetron*, from *perimetreo*, I measure all round: *Gr.*), in Geometry, the line which bounds a figure, whether circular, rectilinear, or mixed. In circular figures instead of *perimeter* we generally use the word *circumference* or *periphery*.

PERIOCTAHE'DRAL (*peri*, around; *oktō*, eight; and *hedra*, a base: *Gr.*), in Crystallography, a term designating a crystal whose primitive form is a four-sided prism, which in its secondary form is converted into a prism of eight sides.

PE'RIOD (*periodos*, literally a going round: *Gr.*), in Arithmetic, three places or digits, separated from the rest by commas; and, in extracting roots, two places or digits for the square root, three for the cube root, &c.——In Astronomy, the time which is taken up by a planet in making its revolution round the sun; or the duration of its course till it returns to the point of its orbit where it was supposed to begin its motion.——In Chronology, the revolution of a certain number of years, as the *Julian period*.——In Grammar, a full stop at the end of any sentence.——PERIOD also means an indefinite portion of any continued state, existence, or series of events; as, the first *period* of life, the earliest *periods* of history, &c.——PERIOD of a disease, in Medicine, the time between the access of one fit, or paroxysm, and that of the next, including the entire exacerbation, decline, intermission, and remission.——In Physiology, *periods* designate the various stages in the development and decay of the animal organization, which are distinguished by a marked character, as the period of childhood, of puberty, &c.

PERIŒ'CI (*perioikoi*, from *peri*, around: and *oikeo*, I inhabit: *Gr.*), in Geography, such inhabitants of the earth as live under the same parallel of latitude, but differ in longitude by 180°. Their seasons are at the same times; but when it is noon with one, it is midnight with the other.

PERIOS'TEUM (*peri*, around; and *osteon*, a bone: *Gr.*), in Anatomy, a nervous vascular membrane, endued with acute sensibility, immediately surrounding both the internal and external surfaces of the bones; it is hence divided into the *external* and *internal periosteum*; and where it externally surrounds the bones of the skull, it is usually called the *pericranium*. The seeming sensibility of the bones is that of this membrane; and its use appears to be to distribute the vessels on their external surfaces.

PERIPATET'ICS (*peripatētikoi*, from *peripateo*, I walk about: *Gr.*), the followers of Aristotle, whose doctrines are distinguished by the name of the *Peripatetic philosophy*. He was called the *Peripatetic*, because he delivered his lectures *walking* in the Lyceum at Athens. The peripatetics were so shackled by respect for their great master, that no men of much note have appeared among them.

PERIPH'ERY (*peripheria*, from *periphero*, I carry round: *Gr.*), the circumference of a circle, ellipsis, or other regular curvilinear figure.

PERIPH'RASIS, or PER'IPHRASE (*periphrasis*, from *peri*, round about; and *phrazo*, I speak: *Gr.*), in Rhetoric, *circumlocution*, or the use of more words than are necessary to express an idea.

PER'IPLUS (*periplous*, from *peripleo*, I sail round: *Gr.*), the title of some fragments which remain of the accounts of ancient voyages.

PERIPNEU'MONY, or PNEUMO'NIA (*peripneumonia*, from *peri*, around; and *pneumōn*, the lungs: *Gr.*), in Medicine, an inflammation of the lungs, attended with acute fever, purulent expectoration, and difficult respiration.

PERIP'TEROUS (*peripteros*, from *peri*, around; and *pteron*, a wing: *Gr.*), in Architecture, an epithet for a place surrounded by a wing, aisle, or passage.

PERIS'CII, or PERIS'CIANS (*periskioi*, from *peri*, around; and *skia*, shadow: *Gr.*), in Ancient Geography, the inhabitants of either frigid zone. The sun, when in the summer signs, moves only round about them, without setting; and consequently their shadows, in the course of the day, turn to every point of the compass.

PER'ISPERM (*peri*, around; and *sperma*, the seed: *Gr.*), in Botany, a thick farinaceous, fleshy, or horny part of the seeds of plants, either entirely or only partially surrounding the embryo, and enclosed within the investing membrane; the *albumen* Also, the *testa*.

PERISTAL'TIC MO'TION (*peristaltikos*, from *peristello*, I compress: *Gr.*), in Medicine, a spiral or vermicular spontaneous motion of the intestines, performed by the contraction of the circular and longitudinal fibres composing their fleshy coats. By means of it the chyle is driven into the orifices of the lacteal veins, and the excrements are extruded.

PER'ISTYLE (*peristulos*, from *peri*, around; and *stulos*, a column: *Gr.*), in Architecture, a court, square, or cloister, with columns on *three* sides. The term is evidently incorrect. The *Rhodian* peristyle had columns on the four sides; those towards the south being frequently higher than the rest.

PERISYS'TOLE (*peri*, near; and *sustolē*, the contraction of the heart: *Gr.*), in Medicine, the pause or interval between the *systole* or contraction, and the *diastole* or dilatation of the heart.

PERITONÆ'UM (*peritonaion*, from *peri*, around; and *teino*, I stretch: *Gr.*), in Anatomy, a thin smooth, lubricous membrane, investing the whole internal surface of the abdomen, and containing, more or less completely, all the viscera comprised within the latter. Inflammation of this membrane is termed *peritonitis*.

PER'JURY (*perjurium*: *Lat.*), in Law

the crime of wilful false swearing, in any judicial proceeding. The common law takes no notice of any false swearing, except such as is committed in some court of justice having power to administer the oath, or before some officer or magistrate invested with similar authority, in some proceeding relative to a civil suit or criminal prosecution; for the law esteems all other oaths unnecessary, at least, and hence will not punish the breach of them. Voluntary oaths are now prohibited, a certain form of declaration being substituted for them, and a false declaration is a misdemeanor. The penalties of perjury have been extended to false oaths by electors, bankrupts, insolvent debtors, &c., by numerous statutes.——*Subornation of perjury* is the offence of inducing a person to commit perjury. At the common law, perjury, and the subornation of it, are punishable by fine and imprisonment. The Greeks are said to have imagined that no person could swear falsely by Styx, without some remarkable punishment; and that no one guilty of perjury could enter the cave of Palæmon at Corinth without being made a memorable example of divine justice; yet, notwithstanding the general abhorrence in which perjury was held by them, and the credit they gave to such accounts of divine inflictions, perjury was much practised by them.

PER'MIAN, a term applied by geologists to a series of strata in the earth's crust intervening between the carboniferous and the triassic systems, and forming a natural group characterized by community of organic remains in various parts of Europe. They form the uppermost number of the great Palæozoic series, and they received their designation from being largely developed in the government of Perm, Russia. In England Permian beds are found in Cumberland, some of the Midland counties, and in Somersetshire and Gloucestershire.

PER'MIT (*permettre*, to allow: *Fr.*), a note given by the officers of the excise allowing the conveyance of spirits, wine, tea, coffee, or other excisable articles, from one place to another.

PERORA'TION (*peroratio*: *Lat.*), the concluding part of an oration, in which the speaker recapitulates the principal points of his discourse or argument, and urges them with greater earnestness and force, with a view to make a deep impression on his audience. The main excellence of a peroration consists in vehemence and brevity.

PEROX'IDE, in Chemistry, a substance containing the largest quantity of oxygen, compatible with its simple oxidation.

PERPENDIC'ULAR (*perpendicularis*: *Lat.*), hanging or extending in a right line from any point towards the centre of the earth or of gravity, and therefore at right angles with the plane of the horizon.——In Geometry, a line making two equal angles, called *right* angles, with the line to which it is perpendicular.——In Gunnery, a small instrument used for finding the centre line of a piece in the operation of pointing it at any object.

PERPET'UAL MO'TION (*perpetualis*: *Lat.*). The problem of a perpetual motion consists in the invention of a machine which has the principle of its motion within itself; and the means proposed to solve this problem have been as various as the laws of mechanics, and of matter, which show its solution to be impossible. The greater number of ingenious men have at some time of their lives made the experiment; but it is rather a reproach than a merit to have tried it. In the attempt, all natural agents, such as heat, atmospheric changes, &c., must be excluded; the inertia of matter, its attractive forces, and combinations of the mechanical powers, being alone admissible. The resistance of the air and the friction of the parts which necessarily retard a machine, and finally stop it, render perpetual motion an impossibility; since no machine, however ingeniously contrived, can possibly give out a motion which it does not receive, or which is greater in total amount than what it receives. Machinery *modifies* but it cannot *produce* motion—that being the office of a *prime mover*.

PERPETU'ITY (*perpetuitas*: *Lat.*), in the doctrine of annuities, a sum which will purchase an annuity for ever. It is equal to the product of the annuity and the number of years in which the simple interest will be equal to the principal. Thus, at 5 per cent., the interest will in twenty years amount to the principal; and at this rate, the value of a perpetuity of 100*l.* is equal to 100*l.* × 20, or 2000*l.*

PERPHOS'PHATE, in Chemistry, a phosphate in which the phosphoric acid is combined with an oxide at the highest degree of oxidation.

PERQUADRISUL'PHATE, in Chemistry, a sulphate with four proportions of sulphuric acid combined with a peroxide.

PER'RY (*poiré*, from *poire*, a pear: *Fr.*), the fermented juice of pears prepared in the same way as cider from apples.

PERSECU'TION (*persecutio*, from *persequor*, I pursue hostilely: *Lat.*), the unjust infliction upon others of pain, punishment, or death; more especially when it is on account of religious creed or mode of worship. The history of the world is full of persecutions; and there is scarcely any dominant sect or party, religious or political, which has not at times disgraced humanity by inflicting unjust punishment or penalties upon their fellow-men, for adhering to principles which their conscience dictated and their judgment approved.

PER'SIAN WHEEL, in Mechanics, a contrivance for raising water above the level of a stream. It consists of a water-wheel, to the rim of which are fixed a number of strong pins supporting buckets. As the wheel revolves, the buckets, which are filled below, are carried up: and when they reach the highest point, they strike against something which empties them into a trough, whence the water is carried by a pipe to where it is wanted. It is evident that this contrivance will not raise the water to a height greater than the diameter of the wheel.

PERSIS'TENT (*persisto*, I persevere: *Lat.*), in Botany, continuing without withering:

as a *persistent calyx*, which lasts after the corolla is withered.

PER'SON (*persona: Lat.*), in Grammar, a term applied to such nouns or pronouns as, whether expressed or understood, are the nominatives in all inflections of a verb. *I*, *thou* or *you*, and *he*, *she*, or *it*, are called the first, second, and third *persons* Hence we apply the word *person* to the termination or modified form of the verb used in connection with the persons.

PER'SONAL (*personalis: Lat.*), in Law, belonging to the person; any moveable thing, whether living or dead: as *personal chattels*, goods, money, or moveables, opposed to *real* property or estates; *personal action*, an action in which a man seeks to recover goods of which he has been deprived, or in which he claims satisfaction in damages for any injury to his person or property—the specific recovery of lands, tenements, and hereditaments, only excepted.——PERSONAL IDENTITY, in Metaphysics, sameness of being, of which consciousness is the evidence.——PERSONAL VERB, in Grammar, a verb that has inflections or endings to express the three persons of each number.

PERSONIFICA'TION (*persona*, a person; and *facio*, I make: *Lat.*), the giving to an inanimate object the sentiments and language of a rational being; or the representation of an inanimate being with the affections and actions of a person The more the imagination prevails among a people, the more common are personifications; and as reflection acquires the ascendency, personifications are less used

PERSPEC'TIVE (*perspectif*: *Fr*; from *perspicio*, I look at: *Lat.*), that branch of optics which teaches the art of representing objects on a plane surface as they appear under the peculiarities incident to distance and height. Consequently, it is a science of the first importance to the painter. In a practical sense, *perspective* is the art of drawing, according to the principles of geometry, the true representations of real objects; and is divided into *lineal perspective*, which relates to the position, form, magnitude, &c, of the several lines or contours of objects, and *aërial perspective*, which has principally a reference to the colouring and shading of distant objects. Suppose we view a point situated beyond an upright transparent plane, such as a glass window, the spot where a straight line from the eye to this point will go through the window is the *perspective representation* of it; for the eye views all objects by means of rays of light, which proceed to it, from the different points of the object, in straight lines. Let us then imagine a spectator to be looking at a prospect without doors, from within, through a glass window; he will perceive not only the vast extent which so small an aperture will admit to be seen by his eye, but also the shape, size, and situation of every object upon the glass. If the objects are near the window, the spaces which they cover upon the glass will be proportionally larger than when they are at a greater distance; if they are parallel to the window, then their shapes upon the glass will be parallel also; but if they are oblique, then their shapes will be oblique, and so on. And he will always perceive, that as he alters the situation of his eye, the situation of the objects upon the window will be altered also If he raises his eye, the objects will seem to keep pace with it, and rise higher upon the window; and the contrary, if he lowers it And so, in every situation of the eye, the objects upon the window will seem to rise higher or lower; and consequently the depth of the whole prospect will be proportionally greater or less, as the eye is elevated or depressed; and the horizon will, in every situation of the eye, be upon a level with it; that is, the imaginary line which parts the earth and sky will seem to be raised as far above the ground upon which the spectator stands as his eye is Now suppose that the person at the window, keeping his head steady, draws the figure of an object seen through it upon the glass with a pencil, as if the point of the pencil touched the object; he would then have a true representation of the object in perspective, as it appears to his eye. For as vision is produced by pencils of rays coming in straight lines to the eye from every point of the visible object, it is plain that, by joining the points in the transparent plane through which all those pencils of rays respectively pass, an exact representation must be formed of the object, as it appears to the eye in that particular position and at that determined distance. And were pictures of things to be always first drawn on transparent planes, this simple operation, with the principle on which it is founded, would comprise the whole theory and practice of perspective. But what is called the *art of perspective*, which comprises certain rules deduced from optics and geometry, constitutes a study too intricate for its thorough development in a work of this kind, and forms a branch of knowledge which can be attained only from systematic works on the subject. Some idea, however, may be conveyed of the meaning of the principal terms employed.—The pane of glass just mentioned would constitute what is called the *perspective plane*, or *plane of the picture*. Planes *passing through the eye* can be seen on the perspective plane only as a line, two of these are very important—that which is horizontal, and that which is vertical—the former termed the *horizontal plane*, and the latter the *vertical plane*. The line in which the former intersects the perspective plane is called the *horizontal line*; and that in which the latter intersects it, the *vertical line* The *ground plane* is a plane on which the spectator stands, and is parallel to the *horizontal plane*; its intersection with the perspective plane is termed the *ground line*. All lines parallel to the horizontal and vertical planes converge to the *point of sight*, the point at which the horizontal and vertical lines intersect each other on the perspective plane; and that is their *vanishing point*. When objects are to be represented, whose surfaces are *oblique* to the perspective plane, every system of parallel lines issuing from them has its own vanishing point, on the horizontal line, but at some distance, at one side or the other of the vertical line. The vanishing point of any oblique system of parallel lines may be easily found, since it is that point where a line from the eye parallel to them cuts the horizontal line. And the position of this point may be determined by drawing a ground-plan of the building, &c., and marking, on the same paper, &c., the positions of the eye, of the ground line, and of the vertical line; then noting where a line from the eye, parallel to that surface of the building whence the system of lines are supposed to proceed, cuts the ground line. This will give the distance of the required vanishing point to the right or left of the vertical line. *Aërial perspective* teaches how to judge of the degree of light which objects reflect in proportion to their distance, and of the gradation of their tints in proportion to the amount of intervening air. Only the nearest objects appear in their true colours and full light; in the case of the more distant, their light and colour become blended with the colours of the vapours which fill the air, in proportion to their distance, until at last the objects become lost, in an indistinct mass of a bluish tinge, in the horizon. A painter, therefore, who would succeed in aërial perspective, ought carefully to study the effects which distance in its different degrees, or accidental lights, have on each particular colour; and in order to give any tint its proper effect in proportion to its distance, it ought to be known what the appearance of that tint would be were it close to the eye, regard being had to that degree of light which is chosen as the principal light of the picture; for if any colour is made too bright for another, or for the general colouring of the picture, the brightness of that colour, to use a technical phrase, will *kill* the rest. In short, the harmony of a picture, and that captivating charm which we find more particularly in good landscape painting, depend greatly upon a correct application of aërial perspective.

PERSPIRA'TION (*perspiro*, I breathe through: *Lat.*), a term applied to the evaporable exudations from the skin. That part which disappears without being noticed is styled insensible perspiration; the sensible perspiration or sweat collects in drops on the skin, and is commonly mingled with the sebaceous secretion and other matters deposited on the surface. Perspiration is chiefly composed of water and carbonic acid. It has been calculated that the average amount of cutaneous exhalation proceeding from an adult person in twenty-four hours is about 2½ lbs. For the due exercise of the functions of the skin it is necessary that it should be frequently washed.

PERTU'SED (*pertusus*, perforated: *Lat.*), in Botany, full of hollow dots on the surface, as a *pertused* leaf.

VIAN BARK. [See BARK, PERUVIAN.]

PESA'DE (*peser*, to weigh: *Fr.*—because he throws all his weight on his haunches), in Horsemanship, the motion of a horse when he raises his fore quarters; keeping his hind feet on the ground, without advancing.

PET'AL (*petalon*, a leaf: *Gr.*), in Botany, a leaf of a flower, as a sepal is a leaf of a calyx. When the corolla consists only of one leaf, that is, forms a tube around the stamens and pistils, it is termed monopetalous; if divided into separate leaves it is said to consist of two, three, or more petals.

PET'ALISM (*petalismos*, from *petalon*, a leaf: *Gr.*), in Antiquity, a form of proscription or banishment practised at Syracuse, by writing the person's name on a leaf; whence the name. It differed from the Athenian *ostracism* merely in being for five years instead of ten, and the name being written on leaves instead of shells or tiles.

PET'ALITE (*petalon*, a leaf; and *lithos*, a stone: *Gr.*), a Swedish mineral of a foliated texture, and a grey or reddish colour. It is a silicate of alumina and lithia.

PET'ALOID (*petalon*, a leaf; and *eidos*, form: *Gr.*), having the form of a petal.

PETARD' (*Fr.*), in Gunnery, an engine formerly used for breaking down gates, barricades, &c. It resembled a high-crowned hat, was made of gun metal, and being charged with gunpowder, it was screwed by the leaf to a thick plank, and was then suspended before the gate which was intended to be blown open. It is found that loose bags of gunpowder are just as effective.

PET'ASUS (*petasos*, from *petannumi*, I spread out: *Gr.*), in Antiquity, a covering for the head, similar to a broad-brimmed hat, and used to keep off the heat of the sun. Mercury is represented with a winged petasus.——In Architecture, the cupola of a house, in the form of a petasus.

PETE'CHIÆ (*petecchie*: *Ital.*), small red spots, caused by the effusion of drops of blood immediately under the cuticle. They resemble flea bites, and indicate an impure state of the blood. Also the purple spots which appear on the skin in malignant fevers. Hence the term *petechial* fever.

PE'TER'S PENCE, an impost, called also 'the fee of Rome,' and in Saxon 'Rome-scot;' at first a voluntary offering to the see of Rome, but afterwards levied from every house or family. It was discontinued in this country by Edward III., when the popes resided at Avignon; was afterwards revived; but was finally abolished in the reign of Henry VIII.

PE'TIOLE (*petiolus*, the *dim.* of *pes*, a foot: *Lat.*), in Botany, the *leaf-stalk*, or the stem which supports the leaf. Hence the epithet *petiolate* for a leaf growing on a petiole.

PETI'TION (*petitio*: *Lat.*), a formal supplication or request made by an inferior to a superior, especially to one having some jurisdiction. Also a paper containing a supplication or solicitation. The right of the British subject to petition parliament is founded on the *bill of rights*; but it is a misdemeanor punishable by fine and imprisonment, without the consent of three or more justices, or a majority of the grand jury at assizes or sessions, to solicit or procure the signatures of more than twenty to a petition for alterations in church or state, or for more than ten to repair with it to the sovereign or parliament.

PETI'TIO PRINCIP'II (a requesting of the principle: *Lat.*), in Logic, the taking a thing for true, and drawing conclusions from it as such; when it is either false, or at least requires to be proved before any inferences can be deduced from it. In common parlance, this is called 'begging the question.'

PETONG', the Chinese name of a species of copper, of a white colour. It differs from *tutenag*, though it is sometimes confounded with it; being an alloy of copper and nickel, while the latter is an alloy of copper, zinc, and nickel.

PET'REL, a genus of birds, the *Procellaria* of ornithologists, including the bird (*P. pelagica*) well known to seamen by the name of 'Mother Carey's chickens,' whose appearance is dreaded by them as a sure prognostic of a storm. They breed in rocks adjoining the sea, forming their nests in cavities. They seem to repose in a common breeze; but upon the approach or during the continuance of a gale, they surround a ship, and catch up the small animals which the agitated ocean brings near the surface, or any food that may be dropped from the vessel. Whisking like an arrow through the deep valleys of the abyss, and darting away over the foaming crest of some mountain wave, they attend the labouring bark in all her perilous course. When the storm subsides, they retire to rest, and are seen no more. Their name signifies 'little Peter,' and is due to their seeming to walk on the waves. Another species is the Fulmar Petrel (*P. glacialis*), which breeds at the Hebrides. This bird is in the habit of following whale ships, as it is extremely fond of the fat of the whale.

PETRIFAC'TION (*petra*, a stone; and *facio*, I make: *Lat.*), a term applied to fossil organic remains [see FOSSILS], and also to articles which having been subjected to water charged with carbonate of lime have become impregnated or coated with it.

PETRO'LEUM (*petræ oleum*, oil of the rock: *Lat.*), in Mineralogy, rock-oil, a combustible fluid which exudes from the earth in various parts of the world. Large quantities have been obtained of late years by sinking wells in Canada and Pennsylvania. Petroleum varies greatly in colour and consistence, being sometimes thin and pale, at others thick and dark coloured. The substances which mineralogists have distinguished by the names asphaltum, maltha, petroleum, and naphtha, are thought by some naturalists to be mere varieties of one species. They may be thus distinguished:—*Asphaltum* forms the connection with bituminous coal, and is found in veins and in small masses, and also sometimes on the surface of lakes. *Maltha* is softer, has a degree of tenacity, and a strong bituminous smell. *Petroleum* is semi-liquid, semi-transparent, of a reddish-brown colour and fœtid odour. *Naphtha* is of a lighter colour, more transparent, perfectly liquid, light, odoriferous, volatile, and inflammable.

PET'ROLINE, a liquid hydrocarbon now extensively consumed in lamps, obtained by distilling petroleum. It closely resembles paraffine oil, obtained by the distillation of coal, but unless carefully prepared it is apt to inflame at a temperature too low for safety.

PETROL'OGY (*petra*, a rock; *logos*, a discourse: *Gr.*), that branch of knowledge which refers to the mineral composition of rocks.

PETROMY'ZON (*petra*, a rock; and *muzo*, I suck: *Gr.*), in Ichthyology, a genus of fishes whose form and motion resemble those of the eel, and of which there are several species. The skeleton is rudimentary, the spine being simply cartilaginous not bony. The mouth is circular, and the fish can use it as a sucker and anchor itself to a stone—whence the name. There are seven gill openings at each side. The *Petromyzon marinus*, or great lamprey, is usually of a brown olive colour tinged with yellowish white. It frequently grows to the length of three feet; and is an inhabitant of the sea, but ascends rivers early in the spring for a few months. It is viviparous, and supposed to subsist almost entirely on worms and fishes. The petromyzon is very tenacious of life, and various parts of the body continue to move long after it is separated from the head. The *Petromyzon fluviatilis*, or little lamprey, is very abundant in the Thames.

PETRO'SA OSSA (rocky bones: *Lat.*), in Anatomy, the inner process of the bones of the temples; so named on account of its hardness and roughness.

PETROSI'LEX (*petra*, a rock; and *silex*, flint: *Lat.*), in Mineralogy, a genus of siliceous earths, consisting for the most part of silica, with a portion of alumina and carbonate of lime. It has no lustre, and melts before the blowpipe.

PET'TY (*petit*, small: *Fr.*), a word of very common use, particularly in Law.——PETTY TREASON, the crime of killing a person to whom duty or subjection is due. Thus the crime of murder, when a wife kills her husband, or a servant his master, has this appellation. Such crimes are now considered murder only.——PETTY LARCENY, the stealing of goods of the value of twelve pence, or under that amount. The distinction between grand and petty larceny has been abolished.——PETTY CONSTABLE, an inferior civil officer, subordinate to the high constable.——PETTY JURY, a jury of twelve freeholders who are empanelled to try causes in a court; so called in distinction from the *grand jury*, which tries the truth of indictments. [See JURY.]

PETUNS'E, or PETUN'TSE, a kind of clay used by the Chinese in the manufacture of porcelain or chinaware. It consists of quartz reduced to a fine powder.

PEW'TER (*peautre*: *Nor. Fr.*), a factitious metal, consisting of tin and lead, or of tin with a little antimony and copper, in proportions suited to the purposes for which it is intended. There are three kinds of English pewter: *plate pewter*, the finest kind, consisting of tin, antimony, bismuth, and copper; *trifle*, which should consist of tin and antimony, but generally contains a considerable quantity of lead; and *ley pewter*, consisting of tin and lead. *Britannia metal*, of which teapots are made, is composed of equal parts brass, tin, antimony, and bismuth; *queen's metal*, also used for teapots, &c., of tin, antimony, bismuth, and lead. The pewterer fashions almost all his articles by casting them in moulds of brass or bronze, which are made in various pieces nicely fitted and locked together. But a process called *spinning* is very commonly employed in Birmingham; it consists in bringing a sheet of pewter against a rapidly revolving tool, by which, with a little dexterity, it is gradually brought into the required form.

PHÆNOG'AMOUS, a botanical term. [See PHANEROGAMOUS.]

PHAGEDÆ'NIC (*phagedainikos*, from *phagedaina*, a cancer; *phago*, I eat: *Gr.*), a medicine or application that eats away proud or fungous flesh. Any wound or ulcer that corrodes or eats away the flesh is also termed phagedænic.——PHAGEDÆNIC WATER, a mixture of quick lime and corrosive sublimate.

PHALÆ'NA (*phalaina*: *Gr.*), in Entomology, Linnæus's name for a genus of moths; but so many new forms have been discovered since his time that a tribe containing many genera has been substituted for the old genus.

PHAL'ANGER, the name of some kangaroos forming the genus *Petaurus*. The skin is expanded between the fore and hind legs, and this enables them to make long leaps from tree to tree. Hence they have been called flying squirrels in New South Wales.

PHAL'ANX (*Gr.*), among the Greeks, a square, or oblong, and compact body of soldiers, having their shields joined, and pikes crossing each other. At first the phalanx consisted of 4000 men, but it was afterwards doubled and even quadrupled. The Macedonian phalanx is thus described by Polybius. It was a square (or rather a parallelogram) of pikemen, consisting of sixteen in flank and five hundred in front; the soldiers stood so close together that the pikes of the fifth rank extended three feet beyond the front; the rest, whose pikes were not serviceable owing to their distance from the front, couched them upon the shoulders of those that stood before them, and, so locking them together in file, pressed forward to support and push on the former rank; by which means the assault was rendered more violent and irresistible.——The word *phalanx* is likewise used for any combination of people distinguished for firmness or solidity of union.

PHAL'AROPUS, a genus of wading birds, allied to the snipes, and inhabiting the northern latitudes of Europe and America. They live on the sea-coasts, fly well, and swim expertly, resisting the heaviest waves; but they never dive. Their flesh is oily and unpalatable.

PHANEROG'AMOUS (*phaneros*, conspicuous; *gamos*, marriage: *Gr.*), a term applied by botanists to those plants which possess flowers, in contradistinction to cryptogamic (*kruptos*, concealed: *Gr.*) plants, or those destitute of flowers, such as ferns, mosses, sea-weeds, and lichens. Phænogamous (*phaino*, I am plainly visible: *Gr.*) is another term applied to flowering plants.

PHANTASMAGO'RIA (*phantasma*, a phantom; and *agora*, an assembly: *Gr.*), an optical exhibition very similar to the magic lantern; but the images are thrown on a transparent screen. They are magnified and diminished at pleasure, and are made to have the appearance of moving by causing the magic lantern to approach to or recede from the screen. All light is excluded, except that which passes through the figures; the rest of the slides being perfectly opaque. The focus of the lens is adjusted by the very motion of the lantern, so as to continue in focus.

PHAR'ISEES (*pharas*, separated: *Heb.*), a sect among the Jews, who distinguished themselves by their zeal for the traditions of the elders, which they derived from the same fountain with the written word itself; pretending that both were delivered to Moses on Mount Sinai, and were therefore of equal authority. From their rigorous observance of these traditions they considered themselves more holy than other Jews, and therefore separated themselves from them; on which account they obtained their name. The Pharisees numbered in their ranks the most distinguished lawyers and statesmen in Judea; and as persons of all conditions were admitted into their society, they gained a political influence which often decided the fate of the Jewish nation, under the Maccabees; and brought into their hands whatever power had been left to the great council by the Romans, in the time of Christ. They believed in a resurrection from the dead, and the existence of angels; but, according to Josephus, their belief extended to no more than a Pythagorean resurrection—that is, of the soul only, which they supposed to enter into another body and be born anew with it. From this resurrection they excluded all who were notoriously wicked, being of opinion that the souls of such persons were doomed to a state of everlasting woe.

PHARMACEU'TICS (*pharmakeutikos*, medical; from *pharmakon*, a drug: *Gr.*), *Pharmacy*, or the art of preparing and administering medicines.

PHARMA'COLITE (*pharmakon*, a medicine; and *lithos*, a stone: *Gr.*), in Mineralogy, *arseniate of lime*, which is either milk-white, or inclining to a yellowish white; and occurs in small reniform, botryoidal, and globular masses, with a silky lustre.

PHARMACOL'OGY (*pharmakon*, a medicine; and *logos*, a discourse: *Gr.*), the science or knowledge of drugs, or the art of preparing medicines. One who writes on this science is called a *pharmacologist*; and he who sells the medicines so prepared, a *pharmacopolist*, or apothecary.

PHARMACOPŒ'IA (*pharmakopoiia*, from *pharmakon*, a medicine; and *poieo*, I make:

Gr.), a *Dispensatory*, or book of directions for the composition of medicines, approved by medical practitioners, or published by authority.

PHAR'MACY (*pharmakeia*, from *pharmakon*, a medicine: *Gr.*), in its most extensive sense, signifies the art of preserving, preparing, compounding, and combining whatever substances may be necessary for medical purposes. And as these may be mineral, vegetable, or animal, to understand the theory of pharmacy requires a knowledge of chemistry, botany, zoology, and mineralogy, in order to determine the properties of the materials employed, and the laws of their composition and decomposition. In a narrower sense, *pharmacy* is merely the art of compounding and mixing drugs according to the prescription of the physician

PHA'ROS, a lighthouse, or lofty building near the sea, where a fire or light is kept burning during the night, to serve as a beacon to vessels. The lighthouse built by Ptolemy Soter, on the small island of Pharos, opposite to Alexandria, was the most celebrated structure of the kind in ancient times, and gave its name to all others. It is said that it was 500 feet high, and that its light could be seen at the distance of 42 British miles This lighthouse was considered one of the wonders of the world.

PHARYNGOT'OMY (*pharunx*, the windpipe; and *temno*, I cut: *Gr.*), in Surgery, the operation of making an incision into the *pharynx*, to remove a tumour or anything that obstructs the passage.

PHA'RYNX (*pharunx*: *Gr.*), in Anatomy, the muscular bag at the back part of the mouth. It is shaped like a funnel, adheres to the fauces behind the larynx, and terminates in the œsophagus. Its use is to receive the masticated food, and to convey it into the œsophagus.

PHASCOLARC'TOS (*phaskōlos*, a wallet; and *arktos*, a bear: *Gr.*), or KOALA, a marsupial animal, closely allied to the phalangers. Its dentition resembles that of the kangaroo rats. It has four hands with naked palms, and crooked pointed nails; but no tail.

PHASCO'LOMYS (*phaskōlos*, a wallet; and *mus*, a mouse: *Gr.*), a marsupial genus including a single species, the wombat, which is of the size of a badger. It is a vegetable feeder.

PHA'SES (*phasis*, an appearance: *Gr.*), in Astronomy, the various appearances of the moon at different ages; being first a *crescent*, then a *semicircle*, then *gibbous*, and lastly *full*. She returns by the same gradations to the state of a new moon.—— In Natural Philosophy, the state, at any particular instant, of a phenomenon which undergoes periodic change; increasing to a given point, and then diminishing regularly; thus, the phase of a *tide*, of an *eclipse*, &c.

PHASIA'NUS (relating to pheasants: from *phasis*, a pheasant: *Lat.*), in Ornithology, a genus of gallinaceous birds, including the different species of pheasant.

PHEAS'ANT (*Phasis*, a river in Asia), a beautiful bird of the genus *Phasianus*, a great favourite with both the sportsman and the epicure. The true pheasant (*Phasianus Colchicus*), which is said to have been brought into Europe from the banks of the Phasis, a river of Colchis, is distinguished by having a long tail, the feathers of which are of different lengths and overlay each other. In their wild state these birds feed, like the rest of the gallinaceous tribe, upon vegetable food. The female constructs her nest of leaves in some retired spot; and if any of her eggs are taken away, she continues, like the common hen, to lay an additional number. There are several varieties, produced by climate and domestication. The golden pheasant (*Phasianus pictus*), a native of China, is remarkable for the beauty of its plumage; the prevailing colours are red, yellow, and blue, and it is characterized by a crest upon the head, which can be raised at pleasure. The iris, bill, and legs are yellow; the tail long and richly tinted, and from above it arise a number of long straight feathers, of a varied hue of scarlet and yellow. Another fine species found in China is the silver pheasant (*Phasianus Nycthemerus*); it is of a silvery white colour, with very delicate black lines on each feather, and black under the belly. But the most splendid bird of this genus is the argus pheasant (*Phasianus Argus*) This species, which is of a large size, is found on the mountains in Sumatra and some other of the Indian isles It is distinguished by its long tail, large wing-feathers, and a profusion of ocellate spots, which give this bird an extraordinary and most beautiful appearance.

PHELLOPLAS'TICS (*phellos*, a cork tree; and *plastikos*, skilful in moulding: *Gr.*), the art of representing works of architecture, on a reduced scale, in cork. It affords very fine models, which are cheaper than those in wood, stone, gypsum, &c.

PHENAKIS'TISCOPE (*phenakismos*, illusion; and *skopeo*, I view: *Gr.*), a philosophical toy, which exhibits the *persistence* of impressions on the retina. It consists of a circular disc, from six to twelve inches in diameter, with rectilinear apertures on its margin, in the direction of its radii. A series of figures—those of a horse and his rider, for instance, leaping over a gate—is drawn on the circumference of a circle parallel to the rim of the disc. The first represents the horse standing before the gate; the second, just leaving the ground; and the others, its successive positions—the last being that he assumes when he has reached the ground, having completed the leap. The observer stands in front of a looking-glass, holding the disc by a handle in his left hand, whirling it rapidly round by a simple means provided for the purpose, and looking at the images in the glass through the apertures in the margin. The horse and his rider are seen only when the apertures pass his eye; and the impression last produced on the retina is not obliterated by that which precedes or succeeds it. All the attitudes, therefore, of the horse and his rider, are thus blended into one action —that of a leap; and the velocity with which this is accomplished depends both on the velocity with which the disc revolves, and the proportion existing between the number of figures painted upon it and the number of apertures.

PHEN'GITE (*phengos*, splendour : *Gr*.), in Mineralogy, a beautiful species of alabaster.

PHENOM'ENON (*phainomenon*, from *phainomai*, I appear : *Gr*.), in Physics, whatever is presented to the eye by observation or experiment, or whatever is discovered to exist ; as, the *phenomena* of heavenly bodies or terrestrial substances ; the *phenomena* of heat, colour, vision, &c.

PHE'ON (*pheōs*, a prickly plant : *Gr*.), in Heraldry, the barbed head of a dart, arrow, or other weapon.

PHIDI'TIA (*Gr*., from *pheidomai*, I spare), in Antiquity, the principal meals of the Lacedæmonians ; they were taken in public, and in the open air, and were remarkable for their frugality. Those who attended them made contributions of flour, wine, cheese, and figs. Rich and poor assisted alike at them, and were upon the same footing ; the design of the institution being, like that of the Roman Charistia, to reconcile differences, and to cultivate peace, friendship, and a good understanding among all the citizens, of every rank and degree.

PHIGA'LIAN MAR'BLES, part of the collection, in the British Museum, known as the *Elgin marbles*. They were discovered near the site of *Phigalia*, a town of Arcadia, and consist of a series of sculptures in alto relievo. They originally formed a frieze round the interior cella of the temple of Apollo the Deliverer, and represent the combat of the Centaurs with the Lapithæ, as also that of the Greeks with the Amazons. From their similarity to the decorations of the Parthenon, they are supposed to be the work of the same artists.

PHILADEL'PHUS (*philadelphos* : *Gr*.), in Botany, a genus of plants, nat. ord. *Philadelphaceæ*, including the deciduous shrubs known as syringas.

PHILAN'THROPY (*philanthrōpia* : from *phileo*, I love ; and *anthrōpos*, a man : *Gr*.), good will and benevolence towards the whole of mankind. It differs from *friendship*, inasmuch as it has no limits to its sphere of action, whereas friendship may be confined to an individual ; but a true *philanthropist* so loves his fellow-men, that he is continually exerting himself for their welfare.

PHILIP'PIC, a word used to denote any discourse or declamation full of acrimonious invective. It derives its name from orations made by Demosthenes against Philip of Macedon, in which the orator bitterly attacked the king as the enemy of Greece.

PHILLYR'EA (*phillurea* : *Gr*.), in Botany, a genus of plants, nat. ord. *Oleaceæ*, including the *mock privet*, a well-known evergreen shrub.

PHILOL'OGY (*philologia* : from *phileo*, I love ; and *logos*, language : *Gr*.), in its usual acceptation, is that branch of literature which comprehends a knowledge of the etymology or origin of words, and whatever relates to the history, affinity, and present state of languages. In a wider sense, it signifies an assemblage of sciences, consisting of grammar, rhetoric, poetry, antiquities, history, criticism, &c., usually understood by the French term *belles lettres*.

PHILOS'OPHER'S STONE, the object of alchemy, a long sought-for preparation, by which, as was pretended, the baser metals might be converted into gold.

PHILOS'OPHY (*philosophia* : from *phileo*, I love, and *sophia*, wisdom : *Gr*.), the love and pursuit of knowledge or wisdom. In a general sense, the term includes observation and reflection on every subject ; or an investigation of the causes of all phenomena, both of mind and of matter. The term *philosopher* originated with Pythagoras, who declined the title of *the Wise*, which had been given to his predecessors, and contented himself with the name of a 'friend or lover of wisdom.' The object of philosophy is the ascertainment of generalized truth. Philosophy, in general, was so imperfect in the earliest ages of antiquity, and even in the more polished times of Greece and Rome, that it appears, when looking down from the high pinnacle of modern improvements and of late discoveries, but little removed from solemn trifling and puerile affectation. Yet some of the ancients, it must be confessed, approached so near to the truth, in matters of high importance, that we are led to wonder how they failed of making its discovery. In ethics and in politics they have left behind them some excellent works ; but the solution of the phenomena of nature was reserved for a Bacon and a Newton. Their reasonings were hypothetical, for they never thought of arguing by induction—the only chain by which truth can be drawn from many of her deep recesses. The reader will find, under their proper heads, the several parts of philosophy, natural and experimental, separately noticed. On a subject so vast and comprehensive, it would be vain indeed for us to attempt a complete treatise, or to endeavour to write a continuous history ; but we may, not inappropriately, introduce in this place a brief sketch of the leading systems which prevailed at different periods of antiquity, and conclude by a few observations on the progress of philosophy during more recent times.——*Pythagorean philosophy*, the system taught by Pythagoras, who flourished 500 years before the Christian era. His followers were great mathematicians, and sought to explain the system of the universe by mathematical reasoning. We have no absolute certainty of the real doctrines of Pythagoras. He is said to have described the Deity as one incorruptible, invisible being ; and to have differed from some of the ancients, Epicurus, for example, in conceiving a connection between God and man—that is, in teaching the doctrine of a superintending providence. He asserted the immortality of the soul ; but in the peculiar sense which appears to have been adopted by Plato, and in which it is used, in part, at this day by the Hindoos. In the cosmogony of Pythagoras, spirit, however, diffused through all animals, was part of the Divinity himself separated only by the gross forms of matter, and ready, whenever disengaged, to unite itself with the kindred essence of God. But God was only purity; and the mind recoiled from the idea of uniting with him a portion of spirit soiled with the corruption of a sinful life; the soul, therefore, once tainted, could never return to the Deity whence it emanated, till it had again recovered its innocence After having animated a human body by which crimes had been committed, it was denied the great object of its desire, a union with its God, and forced to enter into other bodies, till at length it lived a righteous life. To this theory was added another, by means of which punishments, proportioned to offences, were awarded; the soul of a negro-driver must pass into the body of an infant negro; and that which in one existence plied the whip, in the other would receive the lash; the soul of the wicked would occupy the body of some animal exposed to suffering; and that of a being of few foibles undergo a sentence proportionably mild.—Such is the doctrine of the metempsychosis or transmigration of souls, a leading feature in the Pythagorean system. But it is by no means certain that the genuine Pythagoreans held it in the literal sense.——*Socratic philosophy*, or the doctrines of Socrates, who flourished at Athens about 400 years B.C., and died a martyr in the cause of natural religion against paganism He is believed to have been the founder of moral philosophy in Greece, where he preceded Plato, from whose writings his philosophy is chiefly known, as he wrote nothing himself. While other philosophers boasted of their knowledge, he is said to have laid the greatest stress upon his ignorance, asserting that he knew nothing but this, that *he knew nothing* Socrates led men from the contemplation of universal nature to that of themselves—a branch of philosophy which was inculcated in that famous inscription, *Know thyself!* The Socratic method of argument was that of leading an antagonist to acknowledge a proposition by dint of repeated questions, in preference to that of laying it down authoritatively. In a more general sense, Socratic philosophy includes all the sects from Socrates down to the Neo-Platonists, since they all affected to teach his doctrines.——*Platonic philosophy*, a system of theology and morals, delivered by Plato about 350 years before Christ. Plato, it is said, laboured to re-establish natural religion by opposing paganism. The existence of one God was zealously inculcated by him; and also the immortality of the soul, the resurrection of the dead, the everlasting reward of righteousness, and punishment of sin. It was Plato, too, who taught that the world was created by the *Logos* or *Word;* and that through knowledge of the *Word* men live happily on earth, and obtain eternal felicity hereafter. From him, also, came the inducements to monastic life; for he pressed upon his disciples that the world is filled with corruption; that it is the duty of the righteous to fly from it and to seek a union with God, who alone is life and health; that in the world the soul is continually surrounded with enemies; and that, in the unceasing combat through which it has to struggle, it can conquer only with the assistance of God or of his holy angels. 'A happy immortality,' said Plato, 'is a great prize set before us, and a great object of hope, which should engage us to labour in the acquirement of wisdom and virtue all the time of our life.' In morals, he taught that there is nothing solid and substantial but piety, which is the source of all virtues and the gift of God; that the love of our neighbour, which proceeds from the love of God as its principle, produces that sacred union which makes families and nations happy; that self-love causes the discord and division which reign among mankind, and is the chief source of our sins; that it is better to suffer wrong than to do it; that it is wicked to hurt an enemy or to revenge an injury received, that it is better to die than to sin; and that man ought continually to learn to die, and yet to endure life with all patience and submission to the will of God. ——The *Aristotelian philosophy*, which succeeded the Platonic, is characterized by a systematic striving to embrace all the objects of philosophy by cool and patient reflection ——The *Epicurean philosophy*, or the system of Epicurus, an Athenian This teacher laid down, as the basis of his doctrine, that the supreme good consists in pleasure—a proposition that soon suffered a twofold abuse. On the one hand, by misconstruction, it was regarded as a barefaced inculcation of sensuality; on the other, it was adopted by the luxurious, the indolent, and the licentious, as a cloak and authority for their conduct; and hence it has happened that the name Epicurean is now used in an absolute sense to designate one anxiously and luxuriously attentive to his food. Epicurus is reported to have written a great number of works, but of these none are extant; and the particulars of his philosophy, which have come down to us, are chiefly found in the writings of Lucretius, Diogenes Laertius, and Cicero His system, for which he is said to have been almost wholly indebted to Democritus, consisted of three parts: *canonical*, *physical*, and *etherial*. Soundness and simplicity of sense, assisted with some natural reflection, constituted all the method of Epicurus. His search after truth proceeded only by the senses, to the evidence of which he ascribed so great a certainty that he considered them as the first natural light of mankind. It is in the meanings allowed to the words pleasure and pain that everything which is important in the morals, and doubtful in the history, of the Epicurean system is contained. According to Gassendi, the *pleasure* of Epicurus consisted in the highest tranquillity of mind, united with the most perfect health of body—blessings enjoyed only through habits of rectitude, benevolence, and temperance; but Cicero, Horace, Plutarch, and several of the fathers of the Christian church represent his system from a very different point of view. The disagreement, however, is easily reconciled, if we believe one side to speak of what Epicurus *taught*, and the other of what many of his followers, and still more of those who took shelter under his name, were accustomed to *practise*.——To the foregoing we must add the *Stoic philosophy*, or the doctrines of Zenŏ, whose morality was of a magnanimous and unyielding kind, formed to resist temptation to evil, and to render men callous to adversity. Thus the Stoics maintained, among other things, that a man might be happy in the midst of the severest tortures;—the *Cynic philosophy*, the followers of which affected a great contempt of riches and of all sciences except morality;—and the *Sceptical philosophy*, under Pyrrho, who pretended to doubt everything.——In glancing at the *history of philosophy*, the student has abundant opportunities of observing its gradual development as a science, and tracing the progress and aberrations of the human mind—in themselves subjects most important and instructive. Departing from, or only partially retaining, the conflicting dogmas of the Greek and Roman philosophers, we find the scholastics of the middle ages engaged in a struggle for the attainment of intellectual excellence, under the influence of principles derived from the Christian faith and doctrine; yet the progress of philosophic truths was for a long time feeble, irregular, and vacillating. During the 15th century there arose a freer and more independent spirit of inquiry, penetrating deeper into ultimate causes; till, at length, the cool and searching energy of Bacon enabled him to produce his *Novum Organon*, and to give a more substantial basis to the efforts of the intellect, by making observation and experience the foundations of philosophy. Some there were, however, who disputed his laws, and hence new theories occasionally obtained a temporary distinction; but his doctrines, in a great measure, ultimately prevailed; and at no distant period, the calm reasoning of Locke introduced into the study of the human mind the method of investigation which his great predecessor had pointed out.

PHLEBOT'OMY (*phlebotomia*: from *phleps*, a vein; and *temno*, I cut: *Gr*.), in the Medical art, the opening of a vein for the purpose of letting blood.

PHLEGM (*phlegma*, literally inflammation; from *phlego*, I burn: *Gr*), bronchial mucus, a thick tenacious matter secreted in the throat.

PHLOGIS'TON (*phlego*, I burn: *Gr*.), a word formerly used to denote the principle of inflammability; or pure fire fixed in combustible bodies, in distinction from fire in action, or in a state of liberty. But the theory having proved to be false, the term is abandoned

PHŒNI'CIAN LAN'GUAGE, a Semitic dialect allied to the Hebrew, and spoken by the people inhabiting the seacoast of Syria, the cities of Tyre, Sidon, &c., and the colonies they founded, Carthage, &c. The remains of this language are very scanty, and consist chiefly of inscriptions on coins, vessels, stones, pillars, and tablets; especially an altar of the fourth century B.C., recently discovered at Marseilles, and a royal sarcophagus, which has still more recently come to light at Sidon. There are also a few words of this language quoted by old writers, such as the names of persons and places.

PHŒ'NIX (*phoinix*, literally belonging to Phœnicia: *Gr*.), in Fabulous History, a wonderful bird which the ancients describe as of the size of an eagle; its head finely crested with a beautiful plumage, its neck covered with feathers of a gold colour, its tail white, and its body purple. By some authors he was said to come from Arabia to Egypt every five hundred years at the death of his parent, bringing the body with him, embalmed in myrrh, to the temple of the sun, where he buried it. According to others, when he found himself near his end, he prepared a nest of myrrh, and precious herbs, in which he burned himself, but he revived from his ashes in the freshness of youth. The several eras when the phœnix has been seen are fixed by tradition. The first was said to have been in the reign of Sesostris; the second in that of Amasis; and in the period when Ptolemy, the third of the Macedonian race, was seated on the throne of Egypt, another Phœnix directed its flight towards Heliopolis. It is conjectured that the phœnix is a symbol of a period of 500 years, of which the conclusion was celebrated by a solemn sacrifice, in which the figure of a bird was burnt.——PHŒNIX, in Astronomy, one of the new southern constellations

PHONET'IC WRIT'ING (*phōnētikos*, belonging to sound: *Gr*.), that in which sounds are represented, in opposition to *ideographic*, in which objects are represented according to their appearance, and abstract ideas symbolically—as in the figurative part of the Egyptian hieroglyphics.

PHON'ICS (*phōnē*, sound: *Gr*.), the doctrine or science of sounds; otherwise called *acoustics*.

PHONOL'OGY (*phōnē*, a sound; and *logos*, a discourse: *Gr*), that branch of science concerned with the elementary sounds uttered by the human voice, including its various degrees of intonation.

PHOS'GENE GAS (*phōs*, light; and *gennao*, I produce: *Gr*.), in Chemistry, a compound of chlorine and carbonic oxide, which will unite under the influence of light, but not in the dark.

PHOS'PHATE. [See PHOSPHORIC ACID.]

PHOSPHORES'CENCE (*phōs*, light; and *phero*, I bear: *Gr*.), the emission of light by substances at common temperatures or below a red heat. Phosphorescence can be artificially produced in inorganic matter which contains not a particle of phosphorus. What is called the *Bolognian stone* is a native sulphate of barytes which has been calcined, and afterwards exposed to the sun's rays. When cold it will shine in the dark. In the vegetable world, it is well known that certain fungi exhibit this phenomenon, but it is doubtful whether living flowers ever emit luminosity notwithstanding the statements to that effect. Wood in a state of decay is frequently phosphorescent. This is thought to be a vital phenomenon, and due to the mycelium (spawn) of a fungus. Decaying fish is luminous in the dark, possibly from the same cause. In warm latitudes the sea at night often presents a brilliant spectacle in the neighbourhood of a vessel in motion, from the innumerable sparklings of the agitated water, caused, it is generally thought, by the presence of minute animals of low organization, many such being known to emit light when irritated. Several molluscs are phosphorescent under such circumstances, as well as some small crustaceans (*Entomostraca*). Some medusæ give out vivid luminosity, and certain Sertularian zoophytes. Amongst insects there are the wellknown cases of the GLOW WORM and the FIRE-FLY. Other insects also are known to give out light.

PHOSPHOR'IC A'CID, in Chemistry, an acid formed by a saturated combination of phosphorus and oxygen. When phosphorus undergoes combustion in oxygen gas, a great quantity of white fumes are produced and deposited in white flakes, and to this substance the name of *phosphoric acid* is given. It is generally manufactured from *bones*, which consist of phosphate of lime; but there are also other processes for obtaining it. Its component parts are one atom phosphorus, and five atoms oxygen. It unites with alkalis, earths, and metallic oxides, forming with them salts denominated *phosphates*. Phosphate of lime constituent of bone, to which it gives rigidity. The value of guano and coprolites as manure depends in a great measure on the phosphates they contain. *Phosphorous acid*, which contains a smaller proportion of oxygen than phosphoric, consists of one atom phosphorus, and three atoms oxygen. It forms compounds with alkalis, earths, and metallic oxides, which are known under the name of *phosphites*

PHOS'PHORITE, in Mineralogy, a native phosphate of lime.

PHOS'PHORUS (*phōs*, light; *phoreo*, I bring: *Gr.*), in Chemistry, a yellowish semi-transparent substance of the consistence of wax, but brittle in frosty weather. It is obtained by calcining bones, so as to destroy the animal matter; powdering, mixing them with water, and then adding half their weight of strong sulphuric acid. The resulting superphosphate of lime, which remains in solution, is poured off, and then evaporated to dryness; the residue is mixed with about half its weight of charcoal; and, being raised to a high temperature, in a well-luted retort, the beak of which is immersed in water, the phosphorus distils over, and is condensed in the liquid. It is purified by remelting under water and straining through chamois leather. This substance is luminous in atmospheric air, at common temperatures, without producing any perceptible heat, but emitting the odour of garlic. It is sparingly soluble in the fixed and volatile oils, and in ether and alcohol, but is insoluble in water. Its spec. grav. is 1 77; it melts at 108°, takes fire in pure oxygen at 80°—but in the atmosphere at 148°—and boils at 550°. Its slow combustion in common air is prevented by olefiant gas, the vapour of ether, or oil of turpentine. Placed on blotting-paper with soot, it takes fire spontaneously, the oxygen of the air being condensed by the soot. It may be inflamed under water by a current of chlorine, or, if the water is warm, by a current of oxygen. Its solution in ether, on exposure to the air, is luminous, as also the hands, &c., if rubbed with it. When some of the ethereal solution is dropped on a piece of loaf sugar, and the latter is thrown into hot water, the ether and phosphorus will ascend and inflame on the surface of the liquid. A great quantity of phosphorus is now consumed in the lucifer match manufacture. An *allotropic* state of phosphorus exists. It is then amorphous, opaque, and reddish; it is non-luminous in the dark, and is not ignited by friction or percussion at a less temperature than about 482° Fahr. Combined with chlorate of potash, &c., it is highly inflammable. If used in the manufacture of lucifer matches [see LUCIFERS], unlike the ordinary phosphorus, it is not injurious to the workmen; matches made with it are not poisonous, nor do they emit a disagreeable smell; they are not hygrometric, nor liable to be inflamed by accident. The amorphous state is produced by keeping ordinary phosphorus for some time at a temperature of from 450° to 460°. A higher heat would cause explosion, or reduction to ordinary phosphorus

PHOS'PHURET, in Chemistry, a combination of phosphorus with a metal, or other elementary substance, as phosphuret of iron, &c.——PHOSPHURETTED HYDROGEN, a compound of one atom phosphorus, and three atoms hydrogen. It is obtained by filling a retort containing a small quantity of phosphorus, with a solution of caustic potash—no vacant space being left for atmospheric air, which would cause explosion; placing the retort in a solution of common salt, to secure a proper temperature, and prevent danger if it should break; and applying heat. Phosphuretted hydrogen is evolved, and spontaneously inflames on issuing from the water in which the beak of the retort has been immersed. As each bubble of the gas takes fire, a ring of smoke ascends from it, revolving rapidly on axes the planes of which are perpendicular to that of the ring. When the gas is transmitted into oxygen, the effect is very brilliant, but the experiment is dangerous.

PHO'TOGEN (*phōs*, *phōtos*, light; *gennao*, I produce: *Gr.*), one of the liquid hydrocarbons used in lamps, and obtained by the distillation of bituminous shale, lignite, &c.

PHOTOGRAPH'IC ENGRAVING. Experiments on this subject were tried in 1827, and others at various times since that period. The most effective of all the processes proposed is probably that of Fox Talbot. Steel, copper, or zinc plates, such as are used by engravers, are cleaned extremely well; then covered with a gelatinous substance, sensitive to light; and, when this is become dry, the lace, or other object which is to be engraved, is placed upon it, and it is exposed to sunlight for a certain time. On removing the object, a faint image of it will be perceived on the plate, which is to be slightly covered with a little finely powdered gum copal, very carefully scattered over it; and is then to be heated just long enough to melt the copal. When the plate is cold, the etching liquid, which is of various kinds, is poured upon it. This penetrates the gelatine, where the light has not acted upon it; and the details of the picture appear with great rapidity. As soon as it is perceived that the etching will no longer improve, the fluid is wiped off with cotton wool; the plate is well washed with a stream of cold water; and, having been cleaned with soft whiting and water to remove the gelatine, the etching is complete.

PHOTOG'RAPHY, or **PHOTOGEN'IC DRAW'ING** (*phōs*, light; and *grapho*, I write, or *gennao*, I produce: *Gr.*), processes for the production of pictures by means of light. There is reason to believe, however, that the effect is due to other than the luminous rays of the spectrum. We have already given an account of the Daguerreotype process [which see]. The principles of the photographic process, properly so called, may be understood by experimenting with a piece of paper which has been dipped in a solution of nitrate of silver and cautiously dried; if the light is carefully excluded, it remains white; but if it is exposed to light, it gradually darkens, until it at last becomes black. If, while it is white, any opaque or translucent object is laid upon it, so as wholly or partially to intercept the rays, a representation of the object is obtained on the paper. Where the rays have been totally intercepted, it remains white; where none of them have been intercepted, it is dark; and where they have been partially intercepted, it is darkened to an extent dependent on the amount of light to which it has been exposed. To *fix* this picture, it must be washed in the solution of a hyposulphite, to remove the unaltered salt of silver, and prevent further darkening. Instead of paper containing only nitrate of silver, one which, after having been impregnated with that substance, has been dipped in a solution of common salt—to change the nitrate of silver into chloride—is employed; having been found more sensitive to the action of light. Photographic papers have been prepared also with other substances, which improve their delicacy, colour, &c. If some of the prepared paper is put into the camera obscura, a *negative picture* will be produced; and if this is *printed from*—that is, if it is placed between another portion of the prepared paper and the light—a *positive picture* will result. Collodion [which see], carefully spread on glass, and rendered sensitive by some of the salts usually employed for the purpose, is found, in many cases, more convenient than paper. And, by varying the process a little, either a positive or negative picture can be had at pleasure. Albumen may be used instead of collodion, also *waxed paper*, &c. There are other methods, termed the *catalysotype*, the *ferrotype*, &c.; but they vary chiefly in the materials adopted to produce sensitiveness, colour, &c. The advantage of a negative picture is that a number of copies may be made from it without repeating the original process, whereas good copies cannot be obtained from a positive picture.

PHOTOM'ETER (*phōs*, light; and *metron*, a measure: *Gr.*), an apparatus for measuring the intensity of light; or an instrument intended to indicate the different quantities of light on cloudy and bright days, or received by bodies illuminated in different degrees. Instruments for this purpose have been invented by Rumford, De Saussure, Leslie, and others. In Leslie's photometer, the essential part is a glass tube, like a reversed siphon, whose two branches are equal in height, and terminated by balls of equal diameter; one of the balls is of black enamel, and the other of common glass, into which is put some liquid. When the instrument is exposed to the solar rays, those which are absorbed by the dark colour heat the interior air, which causes the liquid to descend with rapidity in the corresponding branch, thus marking the intensity of the light; while no effect is produced by the light upon the transparent ball. Various contrivances have been devised for comparing the lights of two heavenly bodies; but one that is both simple and accurate is yet to be discovered.

PHOTOZINCOG'RAPHY, a method of copying ancient documents, &c., recently invented. Paper, after having been washed over with a solution of the bichromate of potash and gum, and then dried, is placed under a collodion negative, which is a reduced picture of the document, obtained by the photographic process. After it has been exposed to light, its whole surface is coated over with lithographic ink; and a stream of hot water is then poured upon it. As that portion of the coating which was exposed to light is insoluble, while the other portions are easily washed off, a picture of the document, &c., is obtained on the paper, and is ready for transference either to stone, zinc, or a copper plate.

PHRASE (*phrasis*, from *phrazo*, I speak: *Gr.*), a short sentence or expression, said to be *complete* when it conveys complete sense, as 'to err is human,' and *incomplete* when it consists of several words without affirming anything. Any peculiar sentence or short idiomatic expression is also denominated a *phrase*.——In Music, any regular symmetrical course of notes which begin and complete the intended expression.

PHRENI'TIS (*Gr.*, from *phrēn*, the mind), in Medicine, inflammation of the brain, attended with acute fever and delirium.

PHRENOL'OGY (*phrēn*, the mind; and *logos*, a description: *Gr.*), a modern science, which professes to teach, from the conformation of the human skull, the particular characters and propensities of men, presuming that the powers of the mind and the sensations are dependent on peculiar parts of the brain; the front portions governing the intellectual, the middle portions the sentimental, and the hinder portions the animal propensities; the degree of which is dependent on the projection or bulk of the parts. It was long ago observed by physiologists, that the characters of animals were determined by the formation of the forehead, and that their intelligence, in most cases, rose or fell in proportion to the elevation or depression of the skull. But it was reserved to Drs. Gall and Spurzheim to expand this germ of doctrine into a minute system, and to map out the whole cranium into small sections, each being the dwelling-place of a certain faculty, propensity, or sentiment; all these sections amounting to thirty-five, and having certain names given to them to mark their specific qualities, their uses and abuses. Were phrenology an established science, and were it possible to draw unerring deductions from the data which it lays down, its discovery would be the greatest step ever made in mental philosophy, and its application the most beneficial means ever used for the amelioration of the human race. By revealing individual character, it would give security to social intercourse, and make communication prompt and easy. It would disclose real merit and expose unworthiness. The truly wise and good would at last attain their proper station in society, while the ignorant and vicious would be known and shunned. But neither is phrenology an established science, nor, if it were, can it ever be applied with certainty to the illustration of individual character. Many of the organs are so heterogeneous in their nature, that they may indicate faculties or dispositions diametrically opposite, while others are furnished with compensating organs which balance their good or evil tendencies, and so render both ineffective. Thus you may have the organ of *destructiveness* developed largely, and yet be a peaceable and good man. How is this accounted for? Your organs of *cautiousness* and *benevolence* are brought to bear upon it, so that it becomes harmless. It is tolerably certain, that the division of the brain, generally, into *intellectual*, *sentimental*, and *animal* portions, is well founded; perhaps also the existence of some *very marked* organs—destructiveness, for example—can scarcely be denied; and, were it divided internally into thirty-five cells, phrenologists might be justified in marking out its exterior divisions. But it consists of one mass; there is no kind of inward separation or distinction of structure corresponding to the outward boundaries of the phrenological organs; and the interior hollows of the skull do not always correspond with the prominences on the exterior. The science, however, if not carried too far, is not unreasonable, since we generally find a peculiar form of skull to accompany peculiarities of disposition; and the ancient sculptors, though, as a science, phrenology was unknown to them, do not appear to have been regardless of its principles.

PHRYGA'NEA (*phruganon*, a dry stick: *Gr.*—on account of the case, formed of bits of wood, in which the larva encloses itself), a genus of trichopterous insects. [See CADDICE WORM.]

PHTHI'SIS (*Gr.*, from *phthio*, I decay), in Medicine, a consumption occasioned by ulcerated lungs. [See CONSUMPTION.]

PHYLAC'TERY (*phulaktērion*, an amulet; from *phulasso*, I defend: *Gr.*), among the Ancients, a general name given to all kinds of spells, charms, or amulets, which they wore about them, to preserve them from disease or danger. It is more particularly used to signify a slip of parchment, on which was written some text of scripture, especially of the Decalogue, which the more devout Jews wore on the forehead, breast, or neck, as a badge of their religion.——Among the primitive Christians, a *phylactery* was a case in which they enclosed the relics of the dead.

PHYLLO'DIUM (*phullon*, a leaf; *eidos*, form: *Gr.*), a flattened and dilated leafstalk. In several species of Australian acacias the true pinnate leaves are only seen when the plants are young. Afterwards they cease to be developed, and their phyllodia are then frequently mistaken for true leaves.

PHYS'ALITE (*phusalis*, a bubble: *Gr.*—sometimes called *pyrophysalite*, because it intumesces with heat), a mineral of a greenish-white colour, a sub-species of *prismatic topaz*.

PHYSE'TER (*phusētēr*, from *phusao*, I blow: *Gr.*), a genus of *Mammalia* of the cetaceous order. The *Physeter macrocephalus*, or cachalot, the spermaceti whale, grows to the length of sixty feet, and the head is nearly one-third of the whole bulk of the animal. Of all the whales it is one of the most difficult to be taken, and it survives for several days the deepest wounds given it by the harpoon. Its skin, oil, and tendons are all converted by the Greenlanders to some valuable purpose; spermaceti is found in its head, and ambergris in its intestines.

PHYS'ICAL (*phusikos*, belonging to nature: *Gr.*), an epithet denoting that which relates to nature and natural productions, as opposed to things moral or imaginary. We speak of *physical force* or power, with reference to material things; whereas knowledge, skill, &c., constitute *moral force*.——A *physical body* or substance is a material body or substance, in distinction from a spirit or metaphysical substance.——PHYSICAL EDUCATION, a course of training which has for its object the imparting of health and vigour to the bodily organs and powers.

PHYSICIAN (same *deriv.*), one whose profession is to prescribe remedies for diseases, and who is consequently relied on as being skilled in the art of healing. Physicians were held in high estimation in Greece, and the name of Hippocrates is an honour to the profession. The study of physic, indeed, being looked upon as a branch of philosophy, it was sure to command respect in a land where philosophy was in such high repute. It was not exactly so in Rome. As long as the Romans led a hardy and laborious life, physicians were dispensed with, and even totally unknown amongst them, without any bad consequence ensuing. But the luxury of the table, and the excesses with which it was attended, introduced diseases; and diseases introduced physic, to which there had been before so much repugnance. In the 535th year of Rome, some physicians came from Greece to that city, but they had no fixed establishment there till A.U.C. 600. Physic at that time included pharmacy and surgery; for physicians not only compounded medicines, but performed all surgical operations themselves, though they had then but a very imperfect knowledge of anatomy. During the commonwealth there were no physicians or surgeons in the army, but the older citizens, who had almost all served in it, administered medicines, and the soldiers dressed each other's wounds with some well-known remedies used in the city. The emperors, however, having a particular regard for their own health, took physicians with them upon every expedition. The art of healing was not held in high estimation at Rome, and was sometimes professed by slaves. Cæsar granted physicians, as a singular favour, the freedom of the city; and their reputation increased with the luxury of the people.

PHYS'ICO-THEOL'OGY, theology or divinity illustrated or enforced by physics or natural philosophy.

PHYS'ICS (*phusikos*, belonging to nature: *Gr.*), or NATURAL PHILOSOPHY, a term applied to the study of the phenomena of material attraction and those terrestrial phenomena which are studied in the separate sciences of mechanics, acoustics, optics, thermotics, electricity, and meteorology, but not chemistry or physiology.

PHYSIOGNOM'ICS (*phusis*, constitution; and *gnōmonikos*, fit to give judgment: *Gr.*), among Physicians, signs in the countenance which serve to indicate the state, disposition, &c., both of the body and mind; and hence the art of reducing these signs to practice is termed *physiognomy*.

PHYSIOGN'OMY (*phusis*, disposition; and *gnōmē*, a means of knowing: *Gr.*), the art of discovering the predominant temper or other characteristic qualities of the mind, by the features of the face or external signs of the countenance.

PHYSIOL'OGY (*phusiologia*: from *phusis*, nature; and *logos*, a discourse: *Gr.*), that branch of science which treats of the peculiar functions and properties of living bodies, that is, of bodies which grow and reproduce their kind—a definition which includes both vegetables and animals. It is distinct from physics in general, inasmuch as it regards organised bodies alone; and from metaphysics, inasmuch as it does not treat of mind. It is divided into *animal physiology* and *vegetable physiology*. The functions of animal life are not only more complicated in the same individual than those of vegetation, but also more diversified in the different classes into which animals are divided; so that the physiology of each class of animals has its peculiar laws, which is not the case with regard to vegetables.

PI'A MA'TER (the sacred mother: *Lat.*), in Anatomy, the third tunic or membrane of the brain, which not only extends over its whole surface, but insinuates itself into all its cavities. [See MATER.]

PIAN'OFORTE (*piano*, and *forte*: *Ital.*), a well-known musical stringed instrument, the strings of which are extended over bridges rising on the sounding-board, and are made to vibrate by means of small covered hammers, which are put in motion by keys. It has been gradually improved, till it has become one of the most important instruments in all domestic musical entertainments.

PIASSA'VA, fibres largely imported into this country, and employed in the manufacture of brooms. They are obtained from the stem of a Brazilian palm, a species of *Leopoldinia*. 'It grows in moist places, and is about 20 or 30 feet high, with the leaves large, pinnate, shining, and very smooth and regular. The whole stem is covered with a thick coating of the fibres hanging down like coarse hair, and growing from the bases of the leaves which remain attached to the stem. Large parties of men, women, and children go into the forests to cut this fibre. It is extensively used for cables and small ropes for all the canoes and larger vessels on the Amazon.' (A. R. Wallace.)

PIAZ'ZA, an Italian name for a portico or covered walk. The word literally signifies a broad open place or square; whence it came to be applied to the walks or porticoes which surround it.

PIC'ARESQUE (*Fr.*, from *picaresco*, roguish: *Span.*), a term applied to a class of novels once very popular in Spain, in which the adventures of rogues and thieves are related. The amusing story of Lazarillo de Tormes (first printed in 1586) is the earliest specimen of this style, and is mentioned in 'Don Quixote,' by a rank *picaro* or rogue, who is made to say that he had written his own history, wherein he related truths so ingenious and entertaining that no fictions could come up to them.

PI'CIDÆ, in Ornithology, a family of birds in the order of Scansores, including the woodpeckers.

PICK'ET or **PIC'QUET** (*Fr.*), in Military affairs, a certain number of men, horse or foot, who do duty as an outguard to prevent surprises.——PICKETS, in Fortification, sharp stakes, sometimes shod with iron, used in laying out ground, or for pinning the fascines of a battery. In the artillery, *pickets* five or six feet long are used to pin the park lines; in the camp, *pickets* about six or eight inches long are used to fix the tent cords, or five feet long in the cavalry camp to fasten the horses.

PIC'ROLITE (*pikros*, bitter; and *lithos*, a stone: *Gr.*), fibrous serpentine, a green coloured mineral, composed chiefly of carbonate of magnesia.

PIC'ROMEL (*pikros*, bitter; and *meli*, honey: *Gr.*), the characteristic principle of *bile*. The name contains allusion to its sharp, bitter, and sweet taste.

PICROTOX'INE or **PICROTOX'IA** (*pikros*, bitter; and *toxikon*, poison: *Gr.*), in Chemistry, the bitter and poisonous principle of the *Cocculus Indicus*. It crystallizes in small white needles or columns.

PICTS' WALL, an ancient wall begun by the emperor Adrian, A.D. 123, on the northern boundary of England, from Carlisle to Newcastle, to prevent the incursions of the Picts and Scots. It was first made only of turf, strengthened with palisades, till the emperor Severus, coming in person into Britain, caused it to be built with stone; and Actius, the Roman general, rebuilt it with brick, A.D. 430. Some remains of this wall are still visible in parts of Northumberland and Cumberland.

PICTURES'QUE (*pittoresque: Fr.*), a term usually applied to such beautiful objects as are suitable for the artist. In the theory of the fine arts, the word *picturesque* is used as contradistinguished from *poetic* and *plastic*. The *poetical* has reference to the fundamental idea to be represented—to the painter's conception of his subject; whilst the *picturesque* relates to the mode of expressing the conception, the grouping, and the distribution of objects, persons, and lights. The poetical part of a picture, as well as its mechanical execution, may be without fault, and yet the picture be a total failure as regards the picturesque.

PI'CUL, a Chinese and Japanese weight equivalent to about 133 lbs. avoirdupois.

PIECE (*Fr.*), in the Military art, any kind of cannon or mortar. Large guns are called battering-pieces, smaller guns are called field-pieces. We also say a fowling-piece. ——In Heraldry, the honourable *pieces* of the shield are the chief, fesse, bend, pale, bar, cross, saltier, chevron; and, in general, all those which may take up one-third of the field.

PIE'POUDRE (*pied poudreux*, dusty-footed: *Old Fr.*), an ancient court of record, incident to every fair or market, and of which the steward of the person who had the toll of the market was the judge. According to the derivation, the term implies that the court was that of petty dealers or chapmen who assembled on those occasions. It was instituted to administer justice for all commercial injuries committed in that very fair or market, and not in any preceding one; so that it was necessary that the injury should be done, complained of, heard, and determined within the compass of one and the same day, unless the fair continued longer. This court has now fallen into disuse.

PIER (*pierre*, stone: *Fr.*), a very strong stone wall, or mass of solid stone-work, running into the water, to resist the force of the sea, and to withstand the dashing of waves. The term is also applied to the constructions used to support the arches of a bridge or the quay of a wharf, and to that part of the wall of a house which is between windows.

PIE'RIAN, an epithet given to the Muses, from *Pieros*, a mountain of Thessaly which was sacred to them; or from their victory over the nine daughters of *Pieros*, the Macedonian king.

PIETA (*Ital.*), a name given by Italian painters to the subject of the dead Christ with weeping women or attendant angels.

PI'ETISTS (*piétiste: Fr.;* from *pietas*, piety: *Lat.*), a sect of Protestants which sprang up in Germany in the latter part of the 17th century. They professed great strictness and purity of life; affecting to despise learning and ecclesiastical polity, as also forms and ceremonies in religion, and giving themselves up to mystic theology.

PIEZOM'ETER (*piezo*, I squeeze; and *metron*, a measure: *Gr.*), an instrument for ascertaining the compressibility of water, and the degree of such compressibility under any given weight.

PIG'EONS (*Fr.*), birds of the order *Columbidæ*. There are many domesticated varieties, *powters*, *shakers*, *tumblers*, *croppers*, *runts*, &c., names which are indicative of their respective peculiarities. In the wild state the pigeon tribe live on high trees, generally in flocks. Pigeons feed principally on seed, retaining their food in the crop for some time. The greater proportion of the species build on elevated situations; forming a loose nest of small twigs, and wide enough to contain both the parent birds; the female lays two eggs, several times a year. They pair for life; assemble in flocks; and have no song, their note being a simple cooing. They walk well, and fly with great swiftness, continuing on the wing for a long time. Of all the varieties of the pigeon, the most remarkable for its attachment to its native place is the *carrier*, which is distinguished from the others by a broad circle of naked white skin round the eyes. This species has for ages been used for carrying messages of importance where expedition and secresy were required. When a letter is tied under the *carrier's* wing, and the bird is set at liberty, from some inconceivable instinct, it directs its flight, in a straight line, to the very spot from whence it has been taken. In America there is a species of pigeon called the *passenger* or *wild pigeon*, which is extremely prolific, and is of a bluish slate-colour with a white belly. These birds visit the different states in vast multitudes, but are beyond measure abundant in the western states; where, according to Wilson, the ornithologist, some of their 'breeding-places,' as they are termed, extend over a distance of thirty or forty miles. They are taken by means of clap-nets, managed by a person concealed in a hut composed of brushwood, who in this way will sometimes take from ten to forty or fifty dozens at a sweep. Audubon, in speaking of these immense flocks of pigeons, and their extraordinary powers of flight, remarks, that they have been killed in the neighbourhood of New York, with their crops still filled with rice, collected by them in the fields of Georgia and Carolina, the nearest point at which this supply could possibly have been obtained; and as it is well ascertained that, owing to their great power of digestion, they will decompose food entirely in twelve hours, they must have travelled between 300 and 400 miles in six hours, making their speed at an average about one mile in a minute; and this would enable one of these birds, if so inclined, to visit the European continent, as swallows undoubtedly are able to do, in a couple of days. Such, indeed, are their numbers, that the air is described as 'literally filled with pigeons; the light of the noon-day becoming dim, as during an eclipse.' Only four species of pigeon are found wild in Europe; from one of which are descended all the varieties which are domesticated. The great-crowned pigeon, or *gouza*, bears the greatest resemblance to the *Gallinæ* in size; it is a native of New Guinea, and various isles of the Eastern Archipelago. The *Nicobar pigeon* is distinguished for its brilliant plumage; it runs along the ground and builds its nest like that of a partridge; it inhabits Sumatra, Nicobar, and other islands in the east. [See DOVE.]

PIG'MENTS (*pigmentum*, paint: *Lat.*), preparations of various kinds, used in painting and dyeing, to impart the colours required. They are obtained from animal, vegetable, and mineral substances.

PIKE (*pic: Sax.*), the name of a malacopterygious fish of the family of the *Esocidæ*, distinguished by having only one dorsal fin, a long slender body compressed laterally, and the lower jaw projecting beyond the upper. The common pike (*Esox Lucius*) abounds in most of the lakes of Europe. It is remarkable for its voracity, and also for its longevity.——PIKE, in Military Affairs, a long slender staff with a kind of spearhead at the end. Its use among soldiers has been superseded by that of the bayonet.

PILAS'TER (*pilastro: Ital.*), in Architecture, a square column, sometimes insulated, but more frequently placed against a wall, and projecting only one quarter of its depth. The pilaster is different in different orders; it borrows the name of each, and has the same proportions, and the same capitals, members, and ornaments, as the columns themselves.

PIL'CHARD, the *Clupea Pilcardus*, a fish resembling the herring, but rounder and thicker Pilchards appear on the Cornish coast about the middle of July, in immense numbers, and constitute a considerable article of commerce.

PILE (*pil: Sax.*), a large stake or beam, pointed and driven into the earth, as at the bottom of a river, or in a harbour, for the support of a bridge or other superstructure.——PILE (*Fr.*, in Artillery, a heap of shot or shells, either triangular or otherwise.——PILE (*pilum*, a rammer: *Lat.*), in Coinage, a kind of punch, which, in the old way of coining with the hammer, contained the arms, or other figure and inscription, to be struck on the coin. The arms side of a piece of money is yet sometimes called the *pile;* and the head the *cross*, because, in ancient coins, a cross usually took the place of the head.——In Heraldry, one of the minor ordinaries, resembling the pile first described.——PILE (*pilus*, hair: *Lat.*), the fine hairy substance on the surface of cloth, velvet, &c.——PILE-DRIVER, or *Monkey*, a machine for driving pointed beams of wood into beds of rivers or soft foundations, on which to raise bridges and buildings.——*To pile arms*, in Military tactics, is to place three muskets, with or without fixed bayonets, in such a relative position that the butts shall remain firm upon the ground, and the muzzles be close together in an oblique direction.

PILES (*pilulæ*, little balls: *Lat.*), or HÆMORRHOIDS, in Medicine, a diseased condition of the hæmorrhoidal veins. Two forms are commonly recognised; the external or blind, and the internal. The latter is the more serious, as hæmorrhage frequently takes place from the diseased veins. Anything which retards the portal circulation favours the development of piles.

PIL'EUS (*Lat.*, from *pilus*, hair—literally, made of hair or wool), in Antiquity, a hat or cap worn by the Romans, during any indisposition which prevented them from appearing safely with their heads uncovered, as was the general custom. The *pileus* was also worn by such as had lately received their freedom, because, on having their liberty granted, they were shaved; the *pileus*, therefore, being necessary on this account, was also esteemed a badge of liberty; hence *pileo donari* signifies to be made free.——PILEUS, in Botany, the cap of a mushroom or toadstool, expanding horizontally, and covering the fructification.

PIL'GRIM (*Ger.*; from *peregrinus*, a stranger: *Lat.*), one that travels to a distance from his own country to visit a holy place for devotional purposes. In the middle ages, kings, princes, bishops, and others made *pilgrimages* to visit the holy sepulchre at Jerusalem. This was permitted while Palestine was held by the Saracens; but when the Turks obtained possession of that country, the Christian pilgrims were visited with the greatest indignities, and their repeated complaints occasioned the excitement which led to the *crusades*. In subsequent times pilgrimages to Rome, Compostella, Loretto, Tours, and other places where the relics, either real or fictitious, of martyrs and saints attracted the notice of devotees, have been common. To this day pilgrims who travel to Rome are provided for in establishments founded especially for their reception and entertainment. The Mahommedans make an annual pilgrimage to Mecca, the place of their prophet's tomb. The Hindoos also have their holy places, which are visited by pilgrims.

PIL'LAR (*pilar: Span.*), a kind of *column*, either too massive or too slender for regular architecture; the parts and proportions of which, not being restricted to any rules, are arbitrary. The following are the heights and the dates of erection of some of the most remarkable of those erected as monuments:—

Date.	Column.	Place.	Height of Capital.
118	Trajan's	Rome	115 ft.
162	Antonine's	Rome	123
1672	The Monument	London	172
1806	Napoleon's	Paris	115
1832	Duke of York's	London	109
18	Nelson's	London	162

Any kind of column is sometimes, though improperly, termed a *pillar*.

PIL'LORY (*pilori*, from *pilier*, a pillar: *Fr.*), an instrument of punishment, consisting of a frame of wood erected on posts, made to confine the head and hands of a criminal, in order to expose him to view, and to render him publicly infamous. According to Sir Henry Spelman, it was at first specially intended for the punishment of bakers who should be found faulty in the weight or fineness of their bread. In 1816, this mode of punishment was restricted to cases of perjury, and it has since been abolished altogether. The French punishment of a similar description is termed *carcan*, from the iron collar by which the neck of the criminal is attached to the post.

PI'LOSE (*pilosus*, from *pilus*, hair: *Lat.*), in Botany, hairy; a *pilose leaf* is one covered with long distinct hairs. A *pilose receptacle* has hairs between the florets.

PI'LOT (*pilote: Fr.*), one who has the care of a ship and superintends the navigation, either along the seacoast or upon the main ocean. In a stricter sense, a pilot is one whose profession it is to direct a ship's course, when near the coast, into and out of the harbours, bays, roads, rivers, &c., within his peculiar district. The captain neglects or opposes the directions of the pilot at his own risk.

PI'LOTAGE, the compensation made or allowed to a pilot.

PI'LOT-FISH, the *Naucrates Ductor*, a Mediterranean fish, belonging to the *Scomberidæ*, about a foot long. It is of an oblong shape, and the body is marked by six dark cross bands. It derives its name from sailors, who suppose that it acts as a guide to sharks. One or two of them will accompany vessels for many days. The ancients regarded it as sacred, believing that it indicated the true direction to voyagers doubtful of their course.

PI'LUM (*Lat.*), a missile weapon used by the Roman infantry when charging the enemy. It was thick and strong; its shaft, often made of cornel, was four and a half feet long, and the barbed iron, which extended half-way down the shaft, was of the same length. It was used either to throw or thrust with.

PIM'ELITE (*pimelē*, fatness: *Gr.*), in Mineralogy, an earthy substance of an apple-green colour, unctuous, soft, and not fusible by the blowpipe. It is a variety of *steatite*, and is a silico-aluminous mineral, containing oxide of nickel.

PIMEN'TA or **PIMEN'TO**, *Jamaica pepper*, popularly called *all-spice*. The tree producing it (*Myrtus Pimento*) grows spontaneously in Jamaica in great abundance; its flower consists of five petals, and its fruit is a roundish berry, containing a pulpy matter about the seeds. The fruit is gathered when green, and exposed to the sun for many days on cloths; being frequently shaken, and turned until thoroughly dry. Pimenta abounds with a fragrant essential oil, which is separated in great quantity by distillation, and is so heavy that it sinks in water.

PIM'PERNEL, the name of several plants of different genera. The principal are the water pimpernel, of the genus *Veronica*; the scarlet pimpernel, of the genus *Anagallis*; and the yellow pimpernel, of the genus *Lysimachia*.

PIN (*pinn: Sax.*), a well-known small pointed instrument made of brass wire and headed; used chiefly by females for fastening and adjusting their dress. The perfection of pins consists in the stiffness of the wire and its whiteness, in the heads being well turned, and in the fineness of the points. In making this little article, there are no fewer than fourteen distinct operations: 1. *straightening the wire*; 2. *pointing*, which is executed on two iron or steel grindstones, by two workmen, one of whom roughens down, and the other finishes; 3. *cutting into pin lengths*; 4. *twisting of the wire for the pin heads*; 5. *cutting the heads*, 12,000 of which may be cut by a skilful workman in an hour; 6. *annealing the heads*, by putting them into an iron ladle, making them red-hot over an open fire, and then throwing them into cold water; 7. *shaping and fixing on the heads*, which operations are performed by the same workman, who can complete 1500 an hour; 8. *yellowing or cleaning the pins*, by boiling them for half an hour in wine lees, sour beer, or solution of tartar; 9. *whitening or tinning*, which is effected by laying alternate strata of grain-tin and pins in a copper pan, and heating them all together for about an hour; 10. *washing the pins*, in pure water; 11. *drying and polishing* them, in a leathern sack filled with coarse bran, which is agitated to and fro by two men; 12. *winnowing*, or separating them from the bran; 13. *pricking the papers* for receiving the pins; and 14 *papering* them, which is done by children, each of whom by practice is able to put up 36,000 a day. Well indeed may it be said, that the pin manufacture is one of the greatest prodigies of the division of labour. It furnishes 12,000 articles for the sum of three shillings, which have required the united diligence of fourteen skilful operatives. The above is a brief outline of the hand manufacture; but it must not be forgotten that several inventions have been employed to make pins, in part at least, by machinery. The head is now made solid, from a portion of the extremity of the pin—a great improvement. The quantity required for home sale and export amounts to 15,000,000 of pins daily, for this country alone!——The name of *pin* is given to any piece of metal or wood sharpened or pointed in the shape of a pin, which serves to fasten anything: as, the *linch pin*, which locks the wheel to the axle. In shipbuilding, the larger pins of metal are usually called *bolts*, and the wooden pins, *treenails*. A very small wooden pin is called a *peg*.

PINA'CIA (*pinakion*, the *dim.* of *pinax*, a tablet: *Gr.*), among the Athenians, were tablets of brass inscribed with the names of all the citizens in each tribe, who were duly qualified and willing to be judges of the court of Areopagus. These tablets were cast into one vessel provided for the purpose, and the same number of beans a hundred being white and all the rest black, were thrown into another. The names of the candidates and the beans were then drawn out one by one; and they whose names were drawn together with white beans were elected judges or senators.——Also, the tablets on which the judges wrote their verdict of *guilty* or *not guilty*.

PINAC'OTHEK (*pinax*, a painting; *thēkē*, a repository: *Gr.*), a name sometimes given to a picture gallery—e.g., the Pinacothek at Munich, designed by Von Klenze, and opened in 1836.

PIN'CERS (*pincette: (Fr.*), a very useful implement, employed by carpenters, smiths, and other artisans: being a double lever, the fulcrum of which is in the joint.

PINCH'BECK, in Metallurgy, an alloy, containing four parts of copper and one of zinc.

PINDAR'IC, an ode in imitation of the odes of Pindar, the prince of Greek lyric poets [See ODE.]

PINE (*pinus: Lat*), the name of many coniferous trees belonging to several genera. Those belonging to the genus *Pinus* are natives of northern climates. Canada produces the red pine (*Pinus resinosa*) which attains the height of 80 feet with a straight trunk two feet in diameter. It affords a strong and durable wood, which is much used in architecture; also the yellow pine (*P. mitis*), which grows to the height of 60 feet with a straight trunk two feet in diameter The timber is much used in ship-building and all kinds of architecture. The white pine (*Pinus Strobus*) is the loftiest tree in Canada, and its timber, though not without defects, is used in much greater quantities, and for a far greater variety of purposes, than any other. It attains the height of 150 feet, or more, with a trunk five feet in diameter. Trees 220 feet high, with trunks 22 feet in circumference and 120 to the first limb, are sometimes found. It is imported into Britain under the name of Weymouth Pine. The *Pinus Lambertiana* is a species which attains a gigantic size; the trunk rises from 150 to upwards of 200 feet in height, and is from seven to nearly twenty feet in diameter The timber is white, soft, and light, and produces an abundance of a pure amber-coloured resin, which, when the trees are partly burned, acquires a sweet taste, and in this state is used by the natives as a substitute for sugar. The seeds are eaten either roasted, or pounded into coarse cakes for use during the winter season. The *Scotch fir* (*Pinus sylvestris*) is another very important species. The trunk is often eighty feet in height, and four or five in diameter; the timber is applied to a great variety of uses, and is especially suited for masts. These, together with the timber in other forms, are exported from Riga, Memel, Dantzic, and other parts of the north to the various maritime states of Europe, and particularly to Great Britain. Large vessels have been constructed of this pine; and though they last a shorter time than those built of oak, they come next to it in durability. In those districts where it abounds, houses as well as furniture are generally constructed of it, and its lightness and rigidity render it superior to any other material for beams, girders, joists, rafters, &c. It also furnishes excellent charcoal for forges; but a more important product is the resinous matter, consisting of tar, pitch, and turpentine, of which articles it supplies four-fifths of what is consumed in the European dockyards. The Norfolk Island Pine, the *Araucaria excelsa* of botanists, has a peculiar aspect when young, and forms when old a noble tree. The Brazilian Pine belongs to the same genus.

PIN'EAL GLAND (*pinea*, a pine cone: *Lat.*), in Anatomy, a small heart-shaped substance, about the size of a pea, situated at the base of the brain. It was anciently supposed to be the seat of the soul.

PI'NE APPLE, the fruit of species of *Ananassa*, herbaceous plants of South America with leaves somewhat resembling those of the aloe. Many varieties are in cultivation. The fruit resembles, in shape, the cone of the pine-tree, whence it has derived its name.——The place where pine-apples are specially raised is called a *pinery*

PINE'TUM, in Gardening, the place where pines and other coniferous trees are grown

PIN'ION (*pignon: Fr*), in Mechanics, a *spindle*, in the body of which are several notches, which catch the teeth of a wheel with which it is in connection. Also, a small wheel which drives or is driven by a larger.——That joint of a bird's wing which is most remote from the body.

PIN'ITE, a mineral found in prismatic crystals of a greenish white colour, brown, or deep red; it holds a middle place between *steatite* and *mica*, and consists of alumina, silex, and oxide of iron.

PINK (*pince: Fr*), a well-known flower belonging to the genus *Dianthus*, nat. ord. *Caryophyllaceæ*.

PIN'NA (*Gr.*), a genus of conchiferous molluscs, usually called *wing-shells*. The shells of some species occasionally grow to the length of two feet. They are remarkable for the size of the byssus, by which they adhere to rocks, and which is manufactured into gloves, &c., by the natives of Sicily.——PINNA (*Lat.*), in Botany, though it signifies literally a wing, is applied to plants to denote the leaflet of some compound leaves.

PIN'NACE (*pinnasse: Fr.*), a small vessel navigated with oars and sails, and having generally two masts, which are rigged like those of a schooner. Also one of the boats belonging to a man of war, having generally eight oars, and used to carry the officers to and from shore.

PIN'NACLE (*pinnaculum: Lat.*), in Architecture, the top or roof of a building terminating in a point. Among the ancients the pinnacle was appropriated to temples, their ordinary roofs being all flat. It was from the pinnacle that the *pediment* originated

PIN'NATE or PIN'NATED (*pinnatus*, winged: *Lat.*), in Botany, a term applied to compound leaves formed of leaflets on each side of a leafstalk. Accordingly, as there are one, two, or many pairs of leaflets, the terms unijugate, bijugate, or multijugate are employed. If the leaf ends with an odd leaflet it is said to be imparipinnate; but if the leaf ends with a pair of leaflets it is paripinnate. If the leaflets are attached to stalks which branch from the primary stalk the leaf is termed bipinnate; and if the leaflets are attached to a tertiary division of the stalk it is a tripinnate or decomposed leaf. An alternately pinnate leaf is one in which the leaflets are not opposite; and when the leaflets are of different sizes it is said to be interruptedly pinnate.

PINNAT'IFID (*pinna*, a wing; and *findo*, I divide: *Lat.*), in Botany, an epithet for a kind of simple leaf, divided transversely by oblong horizontal segments or jags, not extending to the middle rib.

PINNAT'IPED (*pinna*, a fin; and *pes*, a foot: *Lat.*), in Ornithology, an epithet for birds whose toes are bordered by membranes

PIN'NULATE (*pinnula*, a small wing: *Lat.*), in Botany, an epithet for a leaf in which each pinna is subdivided

PI'NUS (*Lat.*), in Botany, a genus of gymnospermous exogenous plants, nat ord. *Coniferæ.* They are distinguished from the *firs* by their leaves, always evergreen and needle-shaped, growing in pairs, threes, fours, or fives, surrounded by a membranous sheath at their base. [See PINES.]

PIONEE'R (*pionier: Fr*), a military labourer, or one whose business is to attend an army in its march to clear the way, by cutting down trees and levelling roads; as also to work at entrenchments or form mines for destroying an enemy's works.

PIP (*pippe: Belg*), a disease in young birds, particularly in those of the domestic kind. It consists in a white skin or film near the tip of the tongue, and which if not removed proves fatal, as it hinders their feeding.

PIPE (*Fr.*), a long tube or hollow body, used as a conductor of water or other fluids. The pipes used underground were formerly of wood, but are now almost always, in these countries, of metal. They are, when large, of cast iron, with a socket at one extremity, into which the end of the next pipe is inserted The joints thus formed are rendered tight, either by filling the interstices with lead, or by driving in a small quantity of hemp, and filling the remainder of the space with iron cement, made of sulphur, muriate of ammonia, and chippings of iron. *Copper pipes* are extremely durable, and are formed of sheet copper, with the edge turned up and soldered. *Lead pipes* are much employed on account of the facility with which they can be soldered and bent in any direction; but they ought not to be used for conveying water or other liquids intended to be drunk. *Stone pipes* preserve the water contained in them in a very pure state, but are generally very expensive on account of the labour of working them *Earthen pipes* made of common pottery ware, and glazed on the inside, are more liable to be broken than most other kinds, and cannot therefore be relied on.——PIPE, in Music, a wind instrument, smaller than a *flute.* The word is not now the proper technical name of any particular instrument.——PIPE, a wine measure, usually containing 105 imperial, or 126 wine gallons. But, in commerce, the size of the pipe varies according to the description of wine it contains. Thus, a pipe of port is about 128 wine gallons; of sherry, 130; Lisbon and Bucellas, 140; Madeira, 110; and Vidonia, 120.——PIPE, in Law, a roll in the exchequer, otherwise called the *great roll.*——In Mining, the ore when it runs forward endwise in a hole, and does not sink downward or in a vein. ——PIPE-OFFICE, in Law, an office in which a person, called the *clerk of the pipe*, made out leases of crown lands by warrant from the lord-treasurer, the commissioners of the treasury, or the chancellor of the exchequer. He also made out all accounts of the sheriffs, &c. The pipe-office has been abolished ——PAN-PIPES, a rude musical instrument, formed of a range of short pipes bound together side by side, and diminishing in length from one end to the other.

PI'PE-CLAY, a white argillaceous earth, found in great quantities at the isle of Purbeck in Dorsetshire, and at Teignmouth in Devonshire, in lumps, which are purified by diffusion in water. It is a silicate of alumina. The clay, when prepared, is spread on a board and beaten with an iron bar to temper and mix it; it is then divided into pieces of a proper size to form a tobacco pipe, which, being shaped in a mould and baked in a moderately heated furnace, is ready for use. In Germany there are many kinds of *smoking pipes*, with bowls of wood, meerschaum, porcelain, &c A German pipe generally consists of four chief parts—the mouth piece, the tube, the bowl, and a part which connects the two latter, and also serves to collect the juice descending from the tobacco, so as to prevent it from getting into the tube. The Eastern *hookah* is a very curious instrument, the essential feature of which is that the smoke passes through water, loses the particles which give it a disagreeable flavour, and becomes cool before it reaches the mouth.

PIPE FISHES, curious fishes of which several species have been taken on our coasts. The jaws are united and form a long tube. The bodies are slender, and are covered with hard plates instead of scales They belong to the genus *Syngnathus*, which is placed among the *Lophobranchii*, on account of the gills being separated into small rounded tufts.

PI'PER (*Lat.*), in Botany, a genus of plants, nat. ord. *Piperaceæ*, including the Peppers [which see].

PIP'ERINE, a crystallizable principle extracted from black pepper by means of alcohol. It is colourless, has scarcely any taste, fuses at 212°, is insoluble in water, but is soluble in acetic acid, ether, and particularly in alcohol. The pungency of pepper resides in a peculiar fixed oil.

PIPIS'TREL, the common bat or *flitter mouse.*

PIP'PIN (*puppynghe: Dut.*), the name given to several kinds of apples; as the *golden pippin*, the *lemon pippin*, the *Kentish pippin*, &c. *Pippins* take their names from the small spots or pips that usually appear on their sides.

PI'PUL, the sacred Fig-tree of India, known by its rootless branches and its evergreen heart shaped leaves with long narrow points. It is the *Ficus religiosa* of botanists.

PIQUET' (*Fr.*), a game at cards played by two persons, with only thirty two cards; all the deuces, threes, fours, fives, and sixes being set aside.

PI'RACY (*peiratês*, from *peirao*, I attempt: *Gr.*), the crime of robbery or taking of property from others by open violence on the high seas. It includes all acts of plunder and depredation committed at sea, which, if occurring on land, would amount to felony. The word pirate signifies literally an adventurer. Formerly the offence of piracy was only cognizable by the admiralty courts; but as it is inconsistent with the liberties of the nation that any man's life should be taken away, unless by the judgment of his peers, an act was passed in the reign of Henry VIII., establishing a new jurisdiction for this purpose which proceeds according to the course of common law. During the anarchy of the middle ages, when every baron considered himself a sort of independent prince, entitled to make war on others, piracy was universally practised; nor was the nuisance finally abated in Europe till the feudal system had been subverted, and the ascendency of the law everywhere secured. In more modern times, some of the smaller West India islands have been the great resort of pirates; latterly, however, they have been almost all driven from their haunts in that quarter. ——PIRACY is also a word very generally used to express an infringement of the law of *copyright*.

PIROUETTE' (*Fr.*), in Dancing, a rapid circumvolution upon one foot, which, on the stage, is repeated by the dancers many times in succession.——In Riding, a short turn of a horse, which brings his head suddenly in an opposite direction.

PIS'CARY (*piscarius*, pertaining to fish: *Lat.*), in our ancient statutes, the right or liberty of fishing in another man's waters. ——*Piscatory* and *piscine*, whatever relates to fishes or fishing; *piscivorous*, feeding or subsisting on fishes; *piscation*, the act or practice of fishing.

PIS'CES (*Lat.*), in Natural History, the lowest class of the subkingdom vertebrata. [See ICHTHYOLOGY.]——PISCES, in Astronomy, the twelfth sign or constellation in the zodiac. It is represented by two fishes; which are fabled by the Greeks to have been those into which Venus and Cupid were changed, in order to escape the giant Typhon. According to the Egyptian mythology, the *Pisces* were emblematical of the spring season when the season commences.

PIS'CIS VO'LANS (the flying fish: *Lat.*), in Astronomy, a small constellation of the southern hemisphere.

PIS'IFORM (*pisum*, a pea; and *forma*, a form: *Lat.*), granular iron ore, called *pisiform* iron-ore, from its containing small rounded masses resembling peas in size.

PIS'OLITE (*pison*, a pea; and *lithos*, a stone: *Gr.*), a carbonate of lime, slightly coloured by the oxide of iron. It occurs in small globular concretions of the size of a pea or larger, containing each a grain of sand as a nucleus

PISSASPHAL'TUM (*pissa*, pitch; and *asphaltos*, bitumen: *Gr.*), *Earth pitch*, a fluid opaque mineral substance, of a thick consistence, a strong smell, readily inflammable, but leaving a residuum of greyish ashes after burning.

PISSELÆ'UM IN'DICUM (*pisselaion*, from *pissa*, pitch; and *elaion*, oil: *Gr.*), *Barbadoes Tar*, a mineral fluid resembling the thicker bitumens, and approaching nearer than any other, in appearance, colour, and consistence, to the true *pissasphaltum*, though differing from it in other respects. It is very abundant in many parts of America, where it is found trickling down the sides of mountains in large quantities, and sometimes floating on the surface of the water [See PETROLEUM.]

PISTA'CHIA (*pistacia*: *Lat.*; from *pistakia*: *Gr.*), in Botany, a genus of plants belonging to the nat. ord *Anacardiaceæ*. The *Pistachia Terebinthus*, or *Turpentine-tree*, affords the pistachio nut, a kernel of a pale green colour, flavoured like an almond, and yielding a pleasant oil. It is wholesome and nutritive. It grows in Syria, Arabia, and Persia.

PIS'TIL (*pistillum*, a pestle: *Lat.*), in Botany, the female organ of flowers, which in due time is changed into the fruit. It is in the centre of the flower; and, when perfect, consists of the germ or *ovary*, at the base; the *style* and the *stigma*, at or near the summit From the stigma exudes a viscous fluid, which retains the grains of pollen that fall upon it.

PISTILLA'CEOUS, growing on the germ or seed-bud of a flower.

PISTILLIF'EROUS, having a pistil, usually applied to unisexual flowers that have a pistil but no stamens.

PIS'TOL (*pistolet*: *Fr.*), the smallest kind of firearms, and consequently the most portable Pistols are of various lengths, and borne by horsemen in cases at the saddle bow; their management forms a part of the manual exercise of the cavalry.

PIS'TOLE, a Spanish gold coin, but current also in the neighbouring countries. It is worth nearly 16*s.* sterling.——Also a gold coin, current in many parts of Germany, and worth about 8*s.* 6*d.*

PIS'TON (*piston*: *Fr.*), a short cylinder of metal or other solid substance, fitted exactly to the cavity of the barrel of the pump, or other machine to which it is applied. There are two kinds of pistons used in pumps, the one with a valve, and the other without one, called a *plunger*.——The piston of the steam-engine is a circular disc, which moves up and down the cylinder; being connected by a piston rod, which works steam-tight through a stuffing-box, with the external machinery. Great care is taken to render and keep it steam-tight, as any leakage would be both a waste of steam and a loss of power. This is effected very ingeniously by what is called a *metallic packing*, which is so constructed that the more it works the more perfect it becomes. In the early days of the steam-engine, hemp packing was used, which required readjustment or renewal very frequently.

PITA FLAX, a fibre obtained from the leaves of the American aloe, *Agave Americana*. It is not so strong as hemp or flax, but it is employed in the manufacture of various articles in the countries where the plant grows.

PITCH (*pech: Ger.*; from *pissa: Gr.*), a thick, tenacious, oily substance, the residuum of inspissated tar, obtained by incision from pines and firs, and used to preserve wood from the effects of water, and for other purposes. It consists chiefly of carbon and hydrogen, and is, therefore, very combustible. The smoke of pitch condensed forms lamp-black.——*Pitched shirts* were made use of by the Romans to punish incendiaries. They were wrapped up in a garment daubed over with pitch and other combustibles, and then set on fire.——PITCH, in Architecture, the angle at which the roof of a building is set. It is usually designated by the ratio of its height to its width.——PITCH, in Music, the degree of elevation of the key-note of a tune. The instruments used for determining this are called a *pitch-pipe*, &c.——In wheel-work, the distance between the centres of two contiguous teeth. *Pitch-line*, a circle, concentric with the curve which passes through the centres of all the teeth.

PITCH'BLENDE. [See PECHBLENDE.]

PIT'CHER PLANTS, curious climbing herbs, which grow in swamps in China and the East Indies. The midrib of the leaf is prolonged and enlarged into a capacious vessel furnished with a lid. These vegetable pitchers contain water. They form the genus *Nepenthe* of botanists.

PITCH'ING, in Sea language, the movement by which a ship plunges her head and afterpart alternately into the hollow of the sea. This motion may proceed from two causes: the waves which agitate the vessel, and the wind which acts upon the sails, so as to make her bend to every blast.

PITCH'STONE, in Mineralogy, a sub-species of quartz, which, in lustre and texture, resembles pitch. It occurs in large beds, and sometimes forms whole mountains. Its colours are green and black; or brown tinged with red, green, or yellow. It is also called *obsidian* and *resinite*.

PITH (*Sax.*), the soft spongy substance in the centre of the stems of plants. It consists of minute cells closely packed together, sometimes of a rounded or oval shape, but usually angular. The young pith abounds with fluid, which serves to nourish the plant. Afterwards it becomes dry, and often disappears altogether.

PITU'ITARY GLAND (*pituita*, a clammy moisture, as that from the nostrils, &c.: *Lat.*), in Anatomy, a small oval body on the lower side of the brain, supposed by the ancients to secrete the mucus of the nostrils.——PITUITARY MEMBRANE, the mucous membrane that lines the nostrils and sinuses communicating with the nose.

PITYRI'ASIS (from *pitura*, bran: *Gr.*), in Medicine, scurvy of the head and adjacent parts.

PIU, in Music, an Italian word, signifying *a little more*. It is used to increase the force of other words; as *più allegro*, a little brisker; *più piano*, a little softer, &c.

PIV'OT (*pivot: Fr.*), in Mechanics, a pin on which anything turns.——In the Military art, the officer, sergeant, corporal, or private, upon whom the different wheelings are made in military evolutions.

PIZZICA'TO (*Ital.*, from *pizzicare*, to pinch), a Musical term, signifying that the notes are to be produced by pinching the string of the violin with the fingers.

PLAC'ARD (*Fr.*), a printed or written paper, posted in a public place, intended to notify some public measure. It was originally the name of a proclamation issued by authority.

PLACE (*Fr.*), in Physics, that part of space which a body occupies. It is either *absolute* or *relative*—the latter signifying position with relation to other objects. 'Place is to space or expansion,' says Locke, 'as time is to duration. Our idea of place is nothing but the relative position of anything with reference to its distance from some fixed and certain points; whence we say, that a thing has or has not changed place, when its distance either is or is not altered with respect to those bodies with which we have occasion to compare it.'——In Astronomy, the word *place* has various significations: the *physical place* is that in which the centre of a celestial body lies; the *optical place* is that point on the surface of the sphere to which the spectator refers the centre of the star, &c. The *heliocentric place* of a planet is that point of its orbit in which it would appear if seen from the sun. The *geocentric place* is that point of the ellipse to which a planet viewed from the earth is referred.

PLACEN'TA (a cake: *Lat.*), the *After-birth*, an organ through which the blood of the mother passes during circulation before it reaches the fœtus. It is variously modified in the different orders of animals in which it is found. Amongst the mammalia the *Macropidæ* (the kangaroo family) are the only animals destitute of a placenta.——In Botany, that part of the ovary to which the seeds are attached.

PLA'COID (*plax*, a plate: *Gr.*), in Ichthyology, a term applied to the outward coat of fishes when it consists of hard, bony plates. Such plates never overlap, and they frequently bear a spinous projection at the middle. Sharks afford examples of placoid scales, and many fossil fishes were furnished with them.

PLAGUE (*plaga*, a blow: *Lat.*), a malignant and contagious disease, that often prevails in Egypt, Syria, and Turkey. It generally proves fatal; and is due to a want of cleanliness, or exposure to the effluvia of putrid fermentations, of which especially it seems to be a result. Dr. Madden, who paid great attention to the nature, causes, and effects of the plague, observes, in his Travels in Turkey, Egypt, &c., 'I am thoroughly persuaded that the plague is both contagious and infectious; at one period epidemical, at another endemical—in plain English, that the miasma may be communicated by the touch or by the breath; that at one period it is confined to a particular district, and at another is disseminated among the people; but if plague have one form more decided than another, it is the endemic.' He adds, 'I have given the plague the name of *typhus gravissimus*. The symptoms, from the first, are general debility, congestion about the heart, not depending on inflammation, but on the putrescent state of the circulation. It differs little from putrid typhus, except in its duration and eruptions. In every stage of plague nature appears to lie prostrate under the influence of the poisonous miasma; and when the patient sinks at last, it is from the want of force in the constitution to drive out the eruptions on the surface.'

PLAICE (*platessa: Lat.*), a flat-fish, the *Pleuronectes Platessa* of ichthyologists, constituting an article of wholesome food. It rarely exceeds seven or eight pounds in weight; but some twice as heavy have been taken occasionally on our coasts. In ordinary circumstances, it swims slowly and horizontally; but if suddenly frightened it darts upwards with great velocity.

PLAIN'TIFF (*plaintif*, from *plaindre*, to complain: *Fr.*), in Law, the person who commences a suit before a judicial tribunal; opposed to *defendant*.

PLAN (*Fr.*; from *planus*, flat: *Lat.*), the representation of something drawn on a *plane*; as a map, chart, or ichnography. It is, however, more particularly used for the draft of a building, as it appears, or is intended to appear, on the ground; showing the extent, division, and distribution of the area which it occupies into apartments, rooms, passages, &c.——A *geometrical plan* is one in which the solid and vacant parts are represented in their natural proportions. The *raised plan* of a building is otherwise called an *elevation* or *orthography*. A *perspective plan* is that which is exhibited according to the rules of perspective. [See PERSPECTIVE.]

PLANE (*planus: Lat.*), in Geometry, a surface without curvature, one that lies evenly between its boundary lines; and as a right line is the shortest extension from one point to another, so a plane surface is the shortest extension from one line to another.——In Astronomy, the term *plane* is used for an imaginary surface, supposed to pass through any of the curves described on the celestial sphere; as, the *plane* of the ecliptic, the *plane* of a planet's orbit, &c.——In Joinery, &c., a *plane* is an instrument consisting of a smooth piece of wood, with an aperture, through which passes obliquely a sharp-edged tool. It is used in paring and smoothing wood, and is of various forms and sizes adapted to the nature of the work.

PLANE SAIL'ING, in Navigation, the art of determining a ship's place, on the supposition that she is moving on a plane instead of a spherical surface. For short distances this leads to no great error, and it has great conveniences. The ship's place is found by merely calculating a plane triangle, of which the part of the meridian between the ship and the parallel of latitude of the place whence she departed forms the perpendicular; the distance on the parallel between the place of departure and the foot of the perpendicular is the base—technically termed the *departure*; and the distance sailed is the hypothenuse. The angle at the ship is the *course*, and the other acute angle the *complement* of the course. Any two of these four things being given, the triangle can be laid down on the chart, and the others found.

PLAN'ET (*planētēs*, from *planao*, I wander: *Gr.*), a celestial body revolving round the sun as a centre, and continually changing its position with respect to the fixed stars; whence the name. The planets are distinguished into primary and secondary. The *primary* planets are those which revolve round the sun as a centre; and the *secondary*, more usually called satellites or moons, those which revolve about a primary planet as a centre, and constantly attend it round the sun. The primary planets are Mercury, Venus, the Earth, Mars, Jupiter, Saturn, Herschel or Uranus, Neptune, and the smaller planets, or *asteroids*, which have been discovered between the orbits of Mars and Jupiter. [See ASTEROIDS.] Saturn, Jupiter, Mars, and Uranus, being without the earth's orbit, are sometimes called the *superior* planets; Venus and Mercury, being within the earth's orbit, the *inferior* planets. These bodies are opaque, and receive their light from the sun; and they are distinguished from the *fixed* stars, not only by their motion or revolution, but by their not twinkling.——*Motion of the planets.* The primary planets all revolve about the sun, and are accelerated in their motions as they approach to him, but retarded as they recede from him, in such a manner that a ray, drawn from any one of them to the sun, always describes equal spaces or areas in equal times: from which it follows, that the power which bends their course into a curve line must be directed to the sun. This power is no other than that of gravitation, which increases according as the square of the planet's distance from the sun decreases, and *vice versâ*. The universality of this law still further appears by comparing the motions of the different planets; for the power which acts on a planet near the sun is manifestly greater than that which acts on a planet more remote, both because it moves with greater velocity and because it moves in a less orbit, which has more curvature, and separates further from its tangent in arcs of the same length than in a greater orbit. To convey some idea of the space occupied by the planetary system—if, indeed, the idea of space so vast be capable of comprehension sufficiently clear to have its due effect on the mind—it must be observed that the sun, which occupies so small a portion of that space, is 1,400,000 times larger than the earth. Huygens, one of the most expert astronomers of the last century, calculated the time in which a cannon-ball would traverse the space between the earth and the sun, and between the sun and the upper planets, and thence to the fixed stars He deduced from experiments, that it passes through the first hundred fathoms in a second; continuing to move with the same velocity, it will traverse three leagues in a minute, 180 in an hour, and 4320 in a day; and therefore, judging upon astronomical principles of the several distances required, and dividing them by the space so run over in a given time, this philosopher concluded that the ball must take up twenty-five years in passing from the earth to the sun, 125 in passing from the sun to Jupiter, and 250 in reaching Saturn. But how astonishing soever these distances may be, they are trivial compared with that of the fixed stars. Those bodies, which appear only as points in the firmament, and of which millions escape our sight, are considered the centres of systems—suns round which planets revolve. What then must be their distance, since all this multitude of suns shed so small a portion of light on the planet to which we belong! Sometimes the motion of the planets is the same as the apparent motion of the sun, from east to west; their course is then said to be *direct:* when they move in the opposite direction, it is *retrograde:* between each change, they remain for a few days *stationary*. The ancient astronomers found it extremely difficult to explain these phenomena, as they supposed the planets to revolve about the earth; but they are easily understood, on the supposition that they revolve about the sun; in which case they must necessarily present these appearances to a spectator on the earth. Mercury and Venus, and Mars to a certain extent, exhibit *phases*, like the moon, and for a similar reason [see MOON and PHASES]; and all the planets would do so, but for their distance from the sun being very great, compared with the distance of the earth from that luminary. The periodic times of the principal planets, and their mean distances from the sun, are as follows—Ceres being given as a type of the group between Mars and Jupiter:—

Planet.	period.	Distance from the sun.
	Days.	Miles.
Mercury .	87·969258	37,000,000
Venus . .	224·700787	68,000,000
The Earth	365·256361	95,000,000
Mars . .	686·979646	142,000,000
Ceres . .	1681·393100	362,000,000
Jupiter .	4332·584821	485,000,000
Saturn . .	10759·219817	890,000,000
Uranus .		1,800,000,000
Neptune .	60126·710000	2,800,000,000

The following are the excentricities of their orbits, and their inclination to the ecliptic:—

Planet.	tricity.	Inclination.		
Mercury .	0·205515	7	0	9·1
Venus . .	0·006861	3	23	28·5
The Earth	0·016784	0	0	0·0
Mars . .	0·093307	1	51	6·2
Ceres . .	0·078439	10	37	26·2
Jupiter .	0·048162	1	18	51·3
Saturn .	0·056151	2	29	35·7
Uranus .	0·046679	0	46	28·4
Neptune .	0·008720	1	46	59·0

The following are the diameters and volumes of the planets in terms of those of the earth:—

Mercury .	0·398	0·063
Venus . .	0·975	0·927
The Earth .	1·000	1·000
Mars . . .	0·517	0·139
Ceres. . .	—	—
Jupiter . .	10·860	1280 900
Saturn . .	9·982	995 000
Uranus . .	4·332	80·490
Neptune . .	5·236	143·500

The planets and satellites move in the same direction, that is, from west to east (with the very curious exception of the satellites of Uranus, which move in their orbits from east to west); and, as far as known, they all revolve about their axis, from west to east also.

PLA'NE-TABLE, an instrument used in land surveying, by means of which a plan is made on the spot, without protraction or measurement of angles.

PLANETA'RIUM (*planeta*, a planet: *Lat.*), an astronomical machine for showing the relative motions of the planets, and their positions with regard to the sun.

PLA'NE-TREES (*plane: Fr.;* from *platanos: Gr.*), a species of the genus [illegible]*nus*, nat. ord. *Platanaceæ*. The oriental plane-tree (*P. orientalis*), a native of Asia, rises with a straight, smooth branching stem, to a great height, with palmated leaves and long pendulous peduncles sustaining several heads of small flowers. The seeds are downy, and collected into round, rough, hard balls. There is also a downy pubescence which coats the young leaves and branches of plane-trees. The occidental plane-tree (*P. occidentalis*), which grows to a great height, is a native of North America, where it is also called *button-wood.*

PLANIFO'LIOUS (*planus*, flat; and *folium*, a leaf: *Lat.*), in Botany, an epithet for a flower made up of plain leaves or petals, set together in circular rows round the centre. The word *planipetalous* is also used for the same.

PLANIM'ETRY (*planus*, a flat surface: *Lat.*; and *metron*, a measure: *Gr.*), the mensuration of plane surfaces, or that part of geometry which regards lines and plane figures, without considering their height or depth.

PLAN'ISPHERE (*planus*, a plane surface; and *sphæra*, a sphere: *Lat.*), a sphere and its various circles projected on a plane, as in maps, &c.; but more particularly, a projection of the celestial sphere upon a plane, representing the stars, constellations, &c.

PLA'NO (*planus*, flat: *Lat.*), a prefix to several words: as *plano-conical*, plane or flat on one side, and conical on the other; *plano-convex*, flat on one side and convex on the other; *plano horizontal*, having a level horizontal surface or position; *plano-subulate*, smooth and awl-shaped.

PLANT (*plante: Fr.*; from *planta*: *Lat.*). [See BOTANY.]——*Plants used in food and medicine.* Notwithstanding accident first directed attention to the cultivation of culinary vegetables, very few of these are now found in a natural state, and they are then so modified as to escape the notice of any except expert botanists. And it may almost be taken as a general rule, that, in proportion as the nutritive qualities of the plant are improved by cultivation, its medicinal properties are deteriorated. It is also remarkable that a very large proportion of plants employed as food are not now known in a wild state, particularly the different varieties of corn which have followed man in his migrations, and are only met with under the hands of the cultivator. ——*Spontaneous plants.* Few things are more extraordinary than the unusual appearance and development of certain plants in certain circumstances. Thus, after the great fire of London in 1666, the entire surface of the destroyed city was covered with a vast profusion of a species of cruciferous plant, the *Sisymbrium Irio* of Linnæus. When a lake happens to dry up, the surface is immediately usurped by a vegetation which is quite different from that which flourished on its former banks.

PLAN'TAIN-TREE, the *Musa paradisiaca*, a tropical plant congeneric with the Banana tree. In external appearance the two closely resemble each other, but the plantain-fruit requires cooking before being eaten, whereas the banana is eaten as it comes from the tree. It has a soft false stem about 15 feet high, composed of the stalks of the great leaves which spread from the top.

PLANTA'TION (*plantatio: Lat.*), in the West Indies, and also in the United States of America, an estate or tract of land occupied and tilled, either for the culture of the sugar cane, or for tobacco, rice, indigo, or cotton.——In Politics, a colony or settlement of people in a foreign country.

PLANT'-CANE, in the West Indies, sugar canes of the first growth, in distinction from the ratoons, or sprouts from the roots of canes which have been cut.

PLASH (from *plisser*, to plait: *Fr.*), the branch of a tree partly cut and bound to other branches.——PLASHING, bending the boughs of hedges, and interweaving them, so as to thicken them.

PLAS'MA (an image, from *plasso*, I mould: *Gr.*), in Mineralogy, a translucent chalcedony, of a greenish colour and a glittering lustre. It was formerly used for ornamental purposes, but is now in little esteem.——Also the fluid of the blood in which the red particles are suspended. It consists of serum holding fibrine in solution.

PLAS'TER (*plâtre: Fr.*; from *emplastron*, *emplasso*, I daub over: *Gr.*), in Medicine, an external application to the body, spread on linen or leather.——PLASTER, in Masonry, a composition of lime, water, and sand, well mixed into a kind of paste, and used for coating walls of houses, &c.; when dry it becomes hard, but still retains the name.——PLASTER OF PARIS, a preparation of gypsum. [See PARIS, PLASTER OF.]

PLAS'TIC ART (*plastikos*, fit for moulding: *Gr.*), a branch of sculpture, being the art of forming figures of men and animals in plaster, clay, &c.

PLAT'BAND (*plate bande*, a border: *Fr.*), in Architecture, a square moulding having a projection less than its height.——Also, though improperly, the fillets between the flutes of a column. The lintel of a door.

PLATE (*plata*, silver: *Span.*), vessels or utensils of gold or silver. Strictly speaking, the expression gold plate is erroneous, and that of silver plate pleonastic.——PLATE (*platte: Fr.*), in Architecture, a piece of timber, lying horizontally on a wall, to receive the ends of girders, rafters, &c.——PLATE ARMOUR, that which is composed of broad pieces, and thus distinguished from *mail* armour.

PLAT'FORM (*plateforme: Fr.*), in Architecture, a plane level surface, used for the reception of a foundation, building, &c. ——Also, any erection consisting of boards raised above the ground for an exhibition or any other temporary purpose.——PLATFORM, in the Military art, an elevation of earth on which cannon are mounted for the purpose of being fired on an enemy.——PLATFORM, in a ship of war, a place on the lower deck; the orlop.

PLA'TING, the art or operation of covering baser metals with a thin plate of silver, so as to form what is termed *plated goods.* It is said to have been invented by a spurmaker, not for show, but a purpose of real utility. The more elegant spurs were made of solid silver, and, from the flexibility of that metal, were liable to be bent by the slightest accident. To remedy this defect, the workman alluded to, who resided at Birmingham, contrived to make a pair of spurs hollow, and to fill the space with a slender rod of steel or iron. Finding this a great improvement, and being desirous to add cheapness to utility, he made the hollow larger, and of course the iron thicker, till at length he discovered the means of coating an iron spur with silver, in such a manner as to render it equally elegant with those which were made wholly of that metal. The invention was quickly applied to other purposes; and numberless vessels have now the strength and cheapness of copper or iron, with the appearance of silver. With the old method, *plating* was effected by dissolving silver in nitric acid, dipping the copper in the solution, and depending on the affinity of the metals, by which a very slight coating was produced But at Sheffield and Birmingham, plate is now manufactured by rolling ingots of copper and silver together. About the eighth of an inch in thickness of silver is united by heat to copper an inch thick, and about the size of a brick. It is then flattened by steel rollers worked by a steam engine. The malleability of the silver causes it to spread equally with the copper into a sheet of any required thickness, according to the nature of the article for which it is wanted. The plated metal is thus greatly extended in surface, and the plating would still be perfect, though the rolling had reduced it to the thinness of silver paper. This process secures to modern plate a durability notpossessed by any that is silvered by immersion. Hence plated goods are now in general use, and, if fairly used, are nearly as lasting as silver itself; particularly since the introduction of silver edges instead of plated ones, which must be considered the greatest improvement that has taken place in this branch of industry. Manufacturers now avail themselves also of the electrotype process for the purpose of plating. And nothing would be more perfect, but that the purity, and therefore the softness, of the silver deposited on the article, renders it less durable than silver put on in the older way.

PLA'TINUM or PLA'TINA (*plata*, silver: *Span.*—on account of its resemblance to that metal), a white metal, extremely ductile and malleable. Its spec. grav. is 21·5; it is therefore the heaviest substance known. It is not affected by air, moisture, or any of the pure acids, but is dissolved by aqua regia, and is thrown down from the resulting solution by sal ammoniac. It is oxidized at high temperatures by pure potassa and lithia. Platinum is found in South America, Ceylon, and the Uralian mountains—generally in small grains, combined with palladium, rhodium, iridium, and osmium. The flame of the oxyhydrogen blowpipe easily melts thick platinum; otherwise the metal is scarcely fusible, but welds like iron, and can be drawn into an extremely fine wire. Vessels made of it are very valuable to the chemist; but they must be heated with great caution, and scarcely in an open fire, as various substances eat it into holes. In a state of minute division, when it is termed spongy platinum, it has a curious effect upon some gases. If placed in a mixture of hydrogen and oxygen the gases combine, and the metal immediately becomes red hot. In the state of further division called platinum black it possesses strongly the power of condensing gases into its pores; alcohol dropped upon it is at once converted into acetic acid, with an elevation of temperature; formic acid in contact with it is converted into carbonic acid with effervescence.

PLATON'IC, pertaining to Plato, his school, philosophy, opinions, &c. [See PHILOSOPHY.] *Platonic love* signifies a pure spiritual affection, subsisting between persons of opposite sex, and regarding no object but the mind and its excellences. It is also sometimes understood as a sincere disinterested friendship between persons of the same sex, abstracted from any selfish views, and regarding no other object than the individual so esteemed.——PLATONIC SOLIDS, five regular geometrical bodies, described by Plato. They are the tetrahedron, hexahedron, octahedron, dodecahedron, and icosahedron. Except these, no solids can be bounded by like, equal, and regular plane figures, whose solid angles are all equal ——PLATONIC or GREAT YEAR, a period of time determined by the revolution of the equinoxes, or the space of time in which the stars and constellations return to their former places with respect to the equinoxes. This revolution, which is calculated by the precession of the equinoxes, is accomplished in about 25,800 years.

PLA'TONIST, one who adheres to the philosophy of Plato.

PLATOO'N (*peloton*: *Fr.*), in the Military art, a small square body of forty or fifty musketeers, drawn out of a battalion of foot, and placed between the squadrons of horse to sustain them Or a small body acting together, but separate from the main body; hence the expression, to fire by *platoons*.

PLATS, flat ropes belonging to a ship, made of rope yarn. They are used to preserve the cable from galling in the hawse, and are wound about the flukes of the anchors to keep the pennant of the fore-sheet from rubbing against them.

PLAT'YPUS (*platus*, flat; and *pous*, a foot: *Gr.*), a name of the *Ornithorhynchus* [which see].

PLAY (*plegan*, to play: *Sax.*). [See DRAMA.]

PLEA, in Law, that which is alleged by a party in court, in a cause there depending; but in a more limited sense, the defendant's answer to the plaintiff's declaration in a common law court. That which the plaintiff alleges in his declaration is answered, and repelled or justified, by the defendant's *plea*. The word plea anciently meant also a suit or action. *Pleas of the crown*, all suits in the king's name, or in the name of the attorney-general on his behalf. *Common pleas*, those carried on between subjects in civil cases. This is the name of one of the superior courts of common law, also called the court of common bench.

PLEAD'ING (*plaider*, to plead: *Fr.*), in Law, a preparatory allegation, in writing, which intervenes between the commencement of a cause and its trial. The first thing to be done, in deciding a dispute, is to ascertain what it is about. The plaintiff, having brought the defendant into court, makes his first statement, termed a *declaration*. The defendant's answer may be that there is a defect *in substance*, or a defect *in form*, in the plaintiff's proceeding he may controvert his facts, or allege new ones. In the former case he *demurs* to the declaration; in the latter he answers by one or more *pleas*. A demurrer may be made either by plaintiff or defendant, any time during the proceedings; and it is either *general* to substance, or *special* to form. The defendant may answer, or *traverse*, by the *general issue:* a form which originally implied an absolute denial of the plaintiff's facts, but which at present allows the defendant to bring forward other facts—though these more properly form the subject of *special pleas*. When the defendant admits all or part of the plaintiff's facts, but relies on other facts to exonerate him, these latter are to be stated. This is termed a plea *by way of confession and avoidance*. The plaintiff may reply in a second statement, called a *replication*, either by denying the defendant's facts, that is, *by way of traverse*, or alleging fresh ones. The defendant may deny these, or allege fresh ones, in his *rejoinder;* and a *surrejoinder*, a *rebutter*, and a *surrebutter* may be added; and, by the gradual exclusion of superfluous facts, one or more issues in law or fact are gradually produced, the decision of which settles the dispute. Many defences, which might formerly have been given under the *general issue*, must now be pleaded *specially*. The attorneys for the parties give in their respective pleadings, on paper, to the officers of the court. When issue is joined, the pleadings are entered on a parchment roll, and also the issue—in the form of appointing a day for the hearing of the demurrer, if the issue be *in law;* or in the form of a precept to the sheriff of the county named in the pleadings, to summon twelve men for the trial of the issue, if it be *in fact*. This roll is termed the record, and is preserved as a memorial of the proceedings, the verdict and judgment being entered on it.——*Pleading*, amongst the Greeks and Romans, was limited as to its duration by a *clepsydra* or hour-glass of water; and an officer was appointed to see that the orators had justice done them in this respect, and to distribute the proper quantity of water to each.

PLEBE'IAN (*plebeius*, pertaining to the common people: *Lat.*), a person in the lower ranks of society. Amongst the Romans, a free citizen, belonging to that class which was distinguished from the senatorian and equestrian orders. The plebeians at first were employed in cultivating the lands, and in the exercise of trades and mechanical professions; but in time they broke through this illiberal restraint, and claimed a participation with the other orders in places of trust, dignity, and emolument. Their power, from the first appointment of tribunes, in the year of the city 260, gradually increased, till it became an overmatch for that of the senate.

PLEBIS'CITUM (*plebis-scitum*, a decree of the people: *Lat.*), in Roman History, an enactment made by the plebs, comitia, or assembly of the tribes, on the rogation of a tribune. In course of time *plebiscita* obtained the force of laws.

PLEDGE (*pleige: Fr.*), something left in pawn; that which is deposited with another as security for the repayment of money borrowed, or for the performance of some agreement or obligation.——In Law, bail; surety given for the prosecution of a suit, for the appearance of a defendant, or for restoring goods taken in distress and replevied.——To *pledge*, in drinking, is to undertake that a person shall receive no harm while drinking, or from the draught—a practice which originated with our ancestors in their rude state, and which was intended to assure him that he would not be stabbed while drinking, or poisoned by the draught.

PLEDG'ET (*plegghe: Belg.*), in Surgery, a small tent of lint, applied to a wound to absorb the matter discharged from it, and keep it clean.

PLEI'ADS, or PLEI'ADES (*Gr.*), in Astronomy, a cluster of 60 or 70 stars in the constellation Taurus, of which six or seven may be seen by the naked eye. They were supposed by the ancients to be the seven daughters of Atlas and Pleione, changed into stars. Only six are visible in ordinary circumstances; and it was thought that the seventh concealed herself, from shame at having loved a mere mortal. They were called by the Latins *Vergiliæ* (from *ver*, spring), because of their rising about the vernal equinox.

PLEIST'OCENE (*pleistos*, most; *kainos*, recent: *Gr.*), in Geology, the later of the two divisions of the pliocene series of tertiary strata.

PLENIPOTEN'TIARY (*plenus*, full; and *potentia*, power: *Lat.*), a person having full power to transact any business; generally an ambassador from a prince, invested with full authority to negotiate a treaty or conclude peace with another prince or state

PLE'NUM (*Lat.*), in Physics, an old term, denoting that every part of space or extension is full of matter, as maintained by the Cartesians. Those philosophers who do not admit the idea of a vacuum are called *plenists*.

PLE'ONASM (*pleonasmos*, from *pleonazo*, I abound: *Gr.*), in Rhetoric, a redundancy of words, used, though improperly, to express a thought with greater energy or perspicuity; such as, 'I saw it with my own eyes.'

PLEONAS'TE (*pleonastikos*, redundant: *Gr.*), in Mineralogy, a variety of the *spinelle ruby:* so called from its having sometimes four facets on each solid angle of the octahedron.

PLESIOMOR'PHISM (*plēsios*, near; and *morphē*, shape: *Gr.*), the state of crystallized bodies in which the forms are nearly identical.

PLE'SIOSAURUS (*plēsios*, near; and *sauros*, a lizard: *Gr.*), the name of an extinct genus of marine *Saurians*, remarkable principally for their length of neck. Cuvier, says Dr. Buckland, asserts the structure of the plesiosaurus to have been the most heteroclite, and its characters altogether the most monstrous, that have been yet found amid the ruins of a former world. To the head of a lizard it united the teeth of a crocodile, a neck of enormous length resembling the body of a serpent; a trunk and tail having the proportions of an ordinary quadruped, the ribs of a chameleon, and the paddles of a whale. The remains of several species have been found in the lias.

PLETHO'RA (*plēthōrē*, from *plēthuo*, I become full: *Gr.*), in Medicine, excess of blood, or an overloaded state of the blood-vessels of the human body.

PLEU'RA (*Gr.;* literally a rib), in Anatomy, a membrane which covers all the inner surface of the thorax and its viscera. It forms two portions or bags, which are placed beside each other, and form the partition called the *mediastinum.*

PLEURI'TIS, or PLEU'RISY (*pleuritis: Gr.*), in Medicine, an inflammation of the *pleura* or membrane that covers the inside of the thorax. It is accompanied with fever, pain, difficult respiration, and cough.

PLEURONEC'TES (*pleura*, a side; and *nektēs*, a swimmer: *Gr.*), in Ichthyology, a genus of flat fishes, including the plaice, dab (*P. limanda*), flounder (*P. flesus*), and many other species. The genus gives its name to the family *Pleuronectidæ*, which includes all the flat fishes distributed amongst several genera.

PLI'CA POLON'ICA (the Polish plait: *Lat.*), a disease of the hair, peculiar to Poland and the neighbouring countries. In this disease the hair is matted or clotted by means of an acrid humour which exudes from it.

PLINTH (*plinthos*, a brick: *Gr.*), in Architecture, a flat square member. It is used as the foundation of columns, being the flat square table under the moulding of the base and pedestal at the bottom of the order. The abacus of a Tuscan capital is sometimes called its plinth.——PLINTH of a wall, two or three rows of bricks projecting from the wall in form of a platband; and, in general, any flat broad moulding that serves in a front wall to mark the floors, &c.

PLI'OCENE (*pleion*, more; and *kainos*, recent: *Gr.*), in Geology, the name given to the most modern of the divisions of the tertiary epoch. From 90 to 95 per cent. of the fossil shells discovered in the newer pliocene or pleistocene division belong to existing species; whilst only from 30 to 35 per cent. of those found in the older pliocene strata appertain to species still living. The glacial drift or boulder formation of Great Britain, the ochreous gravel of the valley of the Thames, the Norwich crag, and the cave deposits with their bones, belong to the newer division; whilst the Red Crag and Coralline Crag of Suffolk represent the older pliocene. [See GEOLOGY.]

PLOT (*plat: Sax.*), any stratagem or plan of a complicated nature, adapted to the accomplishment of some mischievous purpose; as a *plot* against the government, or against the life of a sovereign.——PLOT, in dramatic writings, the tissue of events in a tragedy or comedy, but more particularly the knot or intrigue, comprising a complication of incidents which is ultimately unfolded.——PLOT, in Surveying, the plan or draft of any field, farm, &c., made by means of instruments, and laid down in the proper figure and proportions.

PLOUGH (*plog: Sax.*), in Agriculture, an important implement for turning over the exhausted soil and bringing up the fresh and fertile parts; so contrived as to save the labour of digging. Ploughs are of different forms, according to the nature of the soil, &c., and are generally worked by horses, though in some places by oxen, and even, in some few instances, by steam. Ploughs without wheels are termed *swing ploughs;* with them, *wheel ploughs.* Each kind has a beam, by which it is drawn; stilts or handles, by which it is guided; a coulter, by which the furrow slice is cut; a *share*, by which the slice is turned up; and a *mould-board*, by which it is turned over. The *subsoil* plough is a strong swing plough, without coulter or mould-board: its use is to follow the common plough and loosen the subsoil. It is one of the greatest improvements of modern times. *Draining* ploughs are of various kinds; the mole plough merely leaves in its track an opening, formed by a small iron cylinder attached to the lower extremity of the coulter; other kinds of draining ploughs cut the soil. The application of steam to the working of ploughs and other agricultural implements is rapidly extending amongst agriculturists.

PLO'VER (*pluvier: Fr.*), in Ornithology, the name of several species of birds of the genus *Charadrius:* as the green plover, which is about the size of the common lapwing; and the grey plover, which has a black beak and green legs, and is a very beautiful bird. Plovers are allied to the waders, but, generally partaking of the nature of land birds, are classed with them.

PLUM (*Sax.*), the fruit of trees belonging to the genus *Prunus*, of which many varieties are in cultivation.

PLUMB, PLUMB'-LINE, or PLUM'MET (*plumbum*, lead: *Lat.*), a leaden weight attached to a string, by which depths are sounded perpendicularly, and perpendiculars are taken by carpenters, masons, &c. Sometimes the string descends along a wooden ruler, &c., raised perpendicularly on another; in which case it becomes a level. The plumb-line was formerly much used in arranging astronomical instruments; but it has been almost entirely superseded by the *spirit level.*

PLUMBA'GO (*Lat.*), GRAPHITE (*grapho*, I write: *Gr.*). [See BLACK LEAD.]

PLUM'BUM (*Lat.*), lead; whence *Plumber*, a worker in lead. [See LEAD.]

PLUME-AL'UM (*pluma*, a feather: *Lat.*), in Mineralogy, a kind of *Asbestos.*

PLU'MIPED (*pluma*, a feather; and *pes*, a foot: *Lat.*), in Ornithology, a bird that has feathers on its feet.

PLUM'MING, among miners, the operation of finding by means of a mine-dial the place where to sink an air-shaft, or to bring an adit to the work, or to find which way the lode inclines.

PLU'MOSE (*plumosus*, covered with feathers: *Lat.*), a term applied to anything formed in the manner of feathers, with a stem and fibres issuing from it on each side; as the antennæ of certain moths, butterflies, &c.——In Botany, a *plumose bristle* is one that has hairs growing on the sides of the main bristle. A *plumose pappus*, or down, is a flying crown attached to some seeds, composed of feathery hairs.

PLU'MULA, or PLU'MULE (*plumula*, a small feather: *Lat.*), in Botany, the growing point of the *embryo:* placed at the apex of the radicle, and the base of the cotyledons which protect it while young. It is the rudiment of the future stem.

PLU'RAL (*pluralis*, belonging to more than one: *Lat.*), in Grammar, an epithet applied to that number of nouns and verbs which is used when we speak of more than one, or that which expresses a number of things.

PLURAL'ITY (*pluralitas: Lat.*), a number consisting of two or more of the same kind; as a *plurality* of worlds, &c.——*Plurality of benefices* or *livings*, is where the same clergyman holds two or more spiritual preferments, with cure of souls. In a plurality of livings, the first, *ipso facto*, becomes void; on which account, the patron may present to it, provided the clerk be not qualified by dispensation, &c., to hold move livings than one. The law strictly enjoining residence, no spiritual person can take and hold together two benefices unless their churches are within three miles of one another by the nearest road, and the annual value of one of them does not exceed 100*l*. If the population belonging to one exceed 3000, he cannot take another having a population of more than 500, nor can any one having more than one benefice with cure of souls take any cathedral preferment. In certain cases, however, the archbishop of Canterbury can dispense with regard to population and yearly value.

PLUS (more: *Lat.*), in Algebra, a character formed thus +, used as the sign of addition, or to mark some distinctive quality, then termed positive.

PLUSH (*peluche: Fr.;* from *pilosus*, hairy: *Lat.*), a kind of shaggy cloth, with a velvet nap on one side, usually composed of a woof of a single woollen thread, and a double warp—the one, wool of two threads twisted; the other of goats' or camels' hair. There are also some plushes made entirely of worsted, and others wholly of hair.

PLUTON'IC ROCKS (*Pluto*, the god of the infernal regions), in Geology, crystalline rocks, destitute of organic remains, supposed to be of igneous origin, and to have been formed at great depths in the earth. Such are GRANITE, SYENITE, and some of the porphyries, which belong to the unstratified division of the hypogene formations. The other division contains rocks which exhibit stratification, such as GNEISS and MICA SLATE. These have been styled METAMORPHIC ROCKS.

PLUVIOM'ETER (*pluvia*, rain: *Lat.;* and *metron*, a measure: *Gr.*), an instrument for ascertaining the quantity of water that falls, as rain and snow, in any particular place. [See RAIN-GAUGE.]

PNEUMAT'ICS (*pneumatikos*, belonging to the air: *Gr.*), the science which treats of the mechanical properties of elastic or aeriform fluids; such as their weight, density, compressibility, and elasticity. The air, being a heavy body, presses like other fluids, in every direction, upon whatever is immersed in it, and in proportion to the depths. This pressure may be thus shown:—Cover a wine-glass, quite full of water, with a piece of writing-paper; then place the palm of the hand over the paper, so as to hold it close to the edge of the glass. The latter may then be turned upside down, and the hand removed, without the water running out. The pressure of the air upon the paper sustains the weight of the water. Air can also be compressed into a much less space than it naturally occupies. Take a glass tube open only at one end—it is of course full of air; plunge the open end into a bowl of water, and the water will rise an inch or so in the tube; the air, therefore, which before filled the whole length of the tube, is compressed into a smaller space. The pressure of the atmosphere is capable of supporting about 33 feet of water or about 29 or 30 inches of mercury. If a glass tube upwards of 31 inches long, and hermetically sealed at one end, be filled with mercury, and, while the mercury is retained in it by the thumb, have its open end immersed in a cup of the same fluid, the altitude of the mercury which remains within it on account of the pressure of the air on the surface of what is in the cup, will be found to vary both at different times and in different places. Hence it appears that the pressure of the atmosphere is variable; and the above-mentioned tube, filled with mercury, has, from its showing this pressure, been called a *barometer* [which see]. By removing the pressure from air, it always expands; nor is it known to what degree this expansion will reach. By increasing the pressure, it may be condensed into any given space, however small, nor has this condensation any known limits. The density of the air is in proportion to the force that compresses it. Gravity acts on aeriform fluids as it does on liquids and solids; but molecular force acts upon them very differently—with liquids and solids it is strongly attractive, with gases repulsive. The volumes of gases are inversely as the pressures they sustain: this is called the *law of Mariotte*, although previously discovered by Boyle. Thus, if air sustaining a pressure of 30 lbs. to the square inch occupies the space of one cubic foot, it will occupy the space of two cubic feet if the pressure is diminished to 15 lbs. The elasticity of gaseous fluids is greatly increased by increase of temperature. In consequence of numerous investigations regarding the mechanical properties of the air, which were made by experimental philosophers in England, France, and Germany, after Torricelli had clearly demonstrated its pressure, the barometer was invented in 1643, and subsequently also a variety of pneumatic machines, such as the air-pump, air-balloon, thermometer, &c. [For further information on this subject, the reader is referred to the articles ATMOSPHERE, AIR, AIR-PUMP, BAROMETER, FLUIDS, GRAVITY, &c.]

PNEUMAT'IC RAIL'WAY. [See RAILWAY.]

PNEUMATO'SIS (*Gr.*, from *pneumatoo*, I inflate), in Medicine, *Emphysema*, a collection of air in the cellular membrane, rendering the part swollen, elastic and crepitating when pressed. It generally arises from some wound in the lungs by which the air escapes into the cellular membrane; and it is sometimes the effect of poison.

PNEUMO'NIA (*pneumonia*, from *pneumōn*, the lungs: *Gr.*), in Medicine, inflammation of the lungs, a disease which generally attacks robust persons, on account of exposure to cold or wet, and suppressed perspiration, and is sometimes produced by over-exertion of the lungs in any way. Fever, cough, difficult breathing, a strong, hard, and quick pulse, are the symptoms at its commencement; and if it is neglected, it may end in suffocation, or in suppuration and gangrene.

PNEUMON'ICS (*pneumonikos*, belonging to the lungs: *Gr.*), medicines proper in diseases of the lungs, in which respiration is affected.

PO'A (grass: *Gr.*), in Botany, a genus of grasses, very abundant in the pasturages of Europe. The *Poa annua* is the most common of all weeds; the *Poa trivialis* and *pratensis* are used extensively in artificial pastures and lawns. Most of the species are agreeable and nutritious to cattle.

POD (*bode*, a little house: *Dut.*), the capsule or seed-vessel of certain plants. It is a word in popular use, but is never applied scientifically.

PODA'GRA (*Gr.*: from *pous*, a foot; and *agra*, a catching—literally a *trap* for the feet), in Medicine, that species of gout which recurs at regular intervals, attacking the joints of the foot, particularly the great toe, the pain of which is described as resembling that produced by laying a burning coal upon it. When the disease is violent the whole foot is so sensitive that the lightest touch causes excruciating pain. The attacks usually recur once a year, in spring or autumn; sometimes twice, and even oftener. [See GOUT.]

PODES'TA (*potestas*, power: *Lat.*), one of the chief magistrates of Genoa and Venice in former times.

PO'DIUM (*Lat.*), in Architecture, the part of the amphitheatre projecting over the arena, above which it was raised between ten and fifteen feet. It was set apart for persons of distinction.

PŒ'CILE (*poikilē*, from *poikilos*, many-coloured: *Gr.*—on account of its fresco paintings), a celebrated portico, or gallery, at Athens, adorned with statues and pictures.

PŒCILIT'IC (*poikilos*, many-coloured: *Gr.*), a geological term applied to the Trias, or upper new red sandstone series, from the variety of colours the strata exhibit.

POET'ICAL JUS'TICE, a term often used in speaking of dramatic writings, to denote a distribution of rewards and punishments to the several characters, according to their deserts, at the catastrophe or close of a piece.

PO'ET-LAU'REATESHIP (*laureatus*: *Lat.*, crowned with laurel), an office in the royal household, bestowed as a mark of court favour upon some eminent poet, with a small annual salary. Formerly it was the duty of this official to produce a set of verses on the sovereign's birth-day, and on the occasion of any other court event of importance, but this is now forborne. The first mention of a poet-laureate was in the reign of Henry III., under the name of *court-poet*. Chaucer, a contemporary of Petrarch, who was crowned with laurel in the Capitol at Rome, assumed the title of *poet-laureate*, and, in the reign of Richard II., obtained a grant as such. We afterwards find poets-laureate noticed in the reigns of Edward IV., Henry VII., &c. Ben Jonson was court-poet to James I., and received a pension, but does not appear to have had the title of *laureate* formally granted to him. Dryden was appointed laureate to Charles II., and afterwards to James II., by regular patent under privy seal. Nahum Tate, Rowe, Eusden, Cibber, Whitehead, T. Warton, Pye, Southey, Wordsworth, and Tennyson, have been Dryden's successors.——POETA LAUREATUS was also an academical title in England, conferred by the universities when the candidate received the degrees in grammar (which included rhetoric and versification). The last instance of a laureated degree at Oxford occurred in 1512.

PO'ETRY (*poiēsis*: *Gr.*), in its ordinary acceptation, is the art of expressing elevated sentiments in measured language according to certain rules, in accordance with harmony and taste; and also the expression of those sentiments in that language. In the latter meaning it is divided into *blank verse* and *rhyme*, and is denominated according to its subject—as *pastoral* for rural objects; *elegiac* for plaintive pieces; *lyrical* for music; *didactic*, or instructive; *satirical*; *humorous*; and *dramatic*, or conversational. But, agreeably with the extensive signification of its Greek origin, poetry, in more extended meaning, includes every effusion, every creation of the mind, whether expressed by the pen, the pencil, or musical sounds. Some languages, as the Greek and the Italian, are admirably adapted for poetry; and they impart to it a charm which is independent of the genius or the taste of the poet. In all cases, poetry has the same general character—that of an appeal to the passions or the affections. The *rules* of poetry and versifying are taught by art, and acquired by study; but the force and elevation of thought, which Horace calls something divine, and which alone makes the poetry of any value, must be derived from nature.

POINT (*Fr.*), among artists, an iron or steel instrument used for tracing designs on copper, wood, stone, &c.——POINT, in Astronomy, a term applied to a certain place marked in the heavens, or distinguished for its importance in astronomical calculations. The four principal points or divisions of the horizon, viz. the east, west, north, and south, are called the *cardinal points*. The zenith and nadir are the *vertical points*; the points where the orbits of the planets cut the plane of the ecliptic, are called the *nodes;* the points where the equator and ecliptic intersect are called the *equinoctial points*—that whence the sun ascends towards the north pole, being called the *vernal point;* and that by which he descends to the south pole, the *autumnal point.* The points of the ecliptic, where the sun's ascent above the equator, and descent below it, terminate, are called the *solstitial points.*——POINT, in Geography, a small cape or headland, jutting out into the sea; thus seamen say, two points of land are *in one another,* when they are so completely in a right line against each other that the innermost is hidden by the outermost.——POINT, in Geometry, as defined by Euclid, is a quantity which has no parts, or which is indivisible. Points are the ends or extremities of lines. If a point be supposed to be moved any way, it will, by its motion, describe a line.——POINT, in Grammar, a character used to mark a division of writing, or the pause to be observed in reading or speaking; as the comma (,) semicolon (;) colon (:) and period (.), also the points of interrogation (?) and admiration (!).——POINTING, the art of dividing a discourse, by points, into periods and members of periods, in order to show the proper pauses to be made in reading.——POINT, in Heraldry, a part of the escutcheon denoting the local position of a figure.——POINT, in modern Music, a dot placed after a note to raise its value or prolong its time one-half, so as to make a semibreve equal to three minims, a minim equal to three crotchets, &c. A note of this kind is usually called a *dotted* note. When a point is placed over a note, it is called *staccato* [which see.]——POINT, in Optics, a term variously applied with reference to the rays of light: thus, the *point of dispersion* is that in which the rays begin to diverge; the *point of incidence,* that point upon the surface of a glass, or any body, on which a ray of light falls; *point of reflection,* the point from which a ray is reflected; *point of refraction,* that point in the refracting surface where the refraction is effected.——POINT, in Literature, a lively turn or expression that strikes with agreeable surprise, such as is usually found or expected at the close of an epigram.——POINT-BLANK, in Gunnery, denotes the shot of a gun levelled horizontally. *Point-blank range* is the extent of the apparent right line described by a ball discharged horizontally. In shooting point-blank, the ball is supposed to move directly to the object without a curve.——POINT OF SIGHT, in Perspective, that point in the perspective plane, at which the horizontal and vertical lines intersect each other. [See PERSPECTIVE.]

POINTS, small pieces of cordage, put through the sail in rows, for the purpose of reefing.——POINTS OF SUPPORT, in Architecture, the collected areas, *on the plan,* of the piers, walls, &c., by which an edifice is supported. The smaller the number of these required by an architect, the greater his skill and economy. The following are the ratio of the area to the points of support, the total area, and the area of the points of support, in some of the most celebrated buildings:—

Building.	Ratio of area to points of support.	Total area in feet.	Area of points of support.
Church of St. Paul, Rome	0·118	106,513	12,655
Church of Notre Dame, Paris . .	0·140	67,343	8,784
Pantheon, Paris .	0·154	60,287	9,269
Cathedral, Milan .	0·169	125,853	21,365
St. Paul's, London	0·170	84,025	14,311
Cathedral, Florence	0·201	84,802	17,030
St. Sophia, Constantinople . .	0·217	103,200	22,567
Pantheon, Rome .	0·232	34,238	7,954
St. Peter's, Rome	0·261	227,069	59,308
Invalides, Paris .	0·268	29,003	7,790

POINT'ER, a variety of the *Canis familiaris,* and the dog used by sportsmen for finding partridges, pheasants, and other feathered game. Though the pointer is not a native of England, it has been long naturalized in it. Pointers differ from setters, as, on approaching sufficiently near to the game, they stand erect, whereas the true-bred setter either sits upon his haunches or lies close to the ground, generally the latter. Pointers are very susceptible of education, and their speed, strength, and persevering nature, enable them to continue the chase for an almost incredible length of time.

POINT'ERS, THE, in Astronomy, are the two outer stars of the quadrangles in the Great Bear so called, because they point to the Pole Star.

POI'SON (*Fr.*), any substance which, by its chemical action, when taken into the stomach, mixed with the blood, or applied to the flesh, disturbs or suspends the circulations and functions necessary to life. Poisons have been divided into irritants, narcotics, and narcotico-acrids. *Irritants* act chiefly on the alimentary canal, causing inflammation and sometimes ulceration of the throat and parts leading to the stomach, &c., nausea, vomiting, the vomited matter being often streaked with blood, and other most painful symptoms connected with the stomach and intestines. *Narcotics* produce totally different effects—headache, vertigo, confused vision, stupor, convulsions, paralysis, and coma. *Narcotico-acrid* poisons produce symptoms which usually consist of those of the other two classes. In large doses, narcotism predominates; in smaller, irritation; and both seldom co-exist. No general rule can be given for the treatment of cases of poisoning. In nearly every instance vomiting should be caused as soon as possible by tickling the throat, and by the use of emetics, such as sulphate of zinc, &c. The stomach-pump should be employed also, but with great caution when there is disorganization on account of the presence of irritants. The stomach should be washed out with bland albuminous or mucilaginous fluids, such as milk, barley-water, flour and water, &c., and sometimes sugar and water. The following are antidotes for the most usual poisons:—For *mineral acids*, *acetic*, or *oxalic* acid—chalk or whiting and water, magnesia and water, soap and water, albuminous diluents. For *alkalis*—vinegar, or any mild acid and water, including even very dilute mineral acids, olive oil, almond oil. For *arsenic*—emetics, thin milk gruel, and other diluents, in large quantities. For *corrosive sublimate*—white of eggs, and water, milk, cream. For *cupreous* poisons—sugar and water, white of eggs and water. For *antimonial* poisons—warm milk, gruel, or barley water, infusion of galls. For *nitrate of silver*, abundance of warm salt and water. For *sulphate of zinc*—solution of carbonate of soda in water, milk, mucilaginous and farinaceous liquids. For *acetate of lead*—emetics, solution of sulphate of soda in water, milk, white of eggs and water. For *opium* and its preparations—emetics, strong coffee; torpor to be prevented by dashing cold water on the face, and forced exercise.

POLA'RIS, or the POLE STAR, so called because it is situate very near the north pole of the axis round which the earth performs its diurnal motion, is a star of the second magnitude, and the principal star in the constellation of the Little Bear. It is the α *Ursæ Minoris* of astronomers. It is easily found, because the two outer stars of the quadrangle, in the Great Bear, point to it.

POLAR'ISCOPE (*polarity*; and *skopeo*, I examine: *Gr.*), an instrument contrived for the exact and convenient observation of the phenomena of polarized light. It consists of two parts, that by which the polarization of the light is effected, and that by which the polarized light is examined. When fitted to a microscope the first is formed of a prism of Iceland spar, so arranged that only one of the rays into which the original pencil of light is divided shall be transmitted; and the second part is a similar prism placed next the eye. By revolving one of these prisms whilst the eye is looking along the tube, the effect of polarization upon an object placed between the two prisms is made apparent.

POLAR'ITY (*polus*, a pole: *Lat.*), that property of bodies which is manifested by the exhibition of opposite and equal effects always tending to neutralize each other. Magnetism and electricity afford instances of polarity.

POLARIZA'TION OF LIGHT (same *deriv.*), in Physics, a change produced upon light by the action of certain media, which cause it to exhibit the appearance of having *polarity*, or sides possessing different qualities. The knowledge of this singular fact with regard to light has afforded an explanation of several intricate phenomena in optics. [See OPTICS.] Light, in ordinary cases, can be decomposed not only into rays of *different colours*, but into *two white rays* of very different properties. This is effected by either refraction or reflection. The most simple example of polarization by refraction is afforded by Iceland spar. If a dot is made on certain surfaces of a piece of this substance, and it is looked at from the opposite side, *two* dots will be seen. If a ray of light be transmitted in the same direction through this spar, it will appear double, and each of these rays will be incapable of reflection, in certain positions of a mirror: that is, when the mirror will not reflect *one* of the rays, on being turned round 90°, without changing its angle of inclination, it will not reflect the *other*. The most brilliant colours may be produced by polarization. The subject is one of the highest interest in philosophy: it has thrown the greatest light, not only on optics, but on other branches of science. ——POLARIZING ANGLE, that angle at which light must fall on a reflecting surface, that it may be polarized; for glass, it is about 33°. A very important law has been discovered, namely, that 'the tangent of the polarizing angle, for any medium, is the index of refraction for that medium.' All reflecting substances are capable of polarizing, if the light is incident at a proper angle. When the angle is not the proper one, the light is polarized to an extent dependent on its approximation to accuracy, and the polarization may be completed by successive reflections.

POLE (*po os*, from *poleo*, I turn round: *Gr.*), in Astronomy, the extremity of the axis of the earth, an imaginary point on the earth's surface, of which there are two, namely, the *Arctic* or North Pole, and the *Antarctic* or South Pole.——POLE OF THE ECLIPTIC, a point on the surface of the sphere, 23° 30′ distant from either pole of the world.——POLE, in Spherics, a point equally distant from every part of the circumference of a great circle of the sphere: it is 90° from the plane of a circle, and in a line called the *axis*, passing perpendicularly through the centre. Thus, the zenith and nadir are the *poles* of the horizon.——MAGNETIC POLES, two points, or rather *positions*, on any magnet, where the opposite magnetic influences chiefly reside. It was long expected that two points would be found on the earth at which the opposite magnetic powers would respectively be found concentrated. Philosophers, however, discovered apparently several; and at last, reasoning from the well-known properties of ordinary magnets, perceived that its magnetic poles, supposing the earth to be, as it is, a great magnet, could not be mere points, but must occupy a considerable space, though its magnetic effects would naturally be most powerful at some particular part of each. It is probable that the earth is an *electro*-magnet, the magnetism of which is caused by electric currents. These are developed by a change of temperature produced by rotation—which brings the different parts *successively* under solar influence. The magnetic poles must, therefore, be in the neighbourhood of the terrestrial.

PO'LE-AXE, a kind of hatchet with

short handle, and a point or claw bending downward from the back of its head. It is principally used at sea, to cut away the rigging of an enemy attempting to board; sometimes it is driven into the side of an enemy's ship to assist in boarding it, and is then called a *boarding-axe*.

PO'LECAT (*Pole* or *Polish-cat*, because of their abundance in Poland), the *Putorius fœtidus* of zoologists, an animal allied to the weazel, which emits a most fœtid stench when pursued. It inhabits Europe and Asiatic Russia. It is a nocturnal animal, and of a bloodthirsty disposition, making great havoc in hen roosts and dovecots.

POLEM'ICS (*polemikos*, belonging to war: *Gr.*), controversial writings particularly on matters of divinity.

POLEM'OSCOPE (*polemos*, war; and *skopeo*, I examine: *Gr.*), in Optics, an oblique perspective glass, or *diagonal opera-glass*, contrived for seeing objects that do not lie directly before the eye. It received its name from its inventor supposing it might be useful in war. It consists of a mirror placed obliquely in a tube having an opening in the side opposite to the mirror, so that rays from any object, falling on the mirror, are reflected to the eye. Opera-glasses [which see] are sometimes constructed on this principle.

PO'LE-STAR, or **PO'LAR STAR**. [See POLARIS.]

POLI'CE (*Fr.*), the internal regulation of a kingdom, city, or town. In its most popular acceptation, the *police* signifies the administration of the municipal laws and regulations of a city, incorporated town, or borough; as the *police* of London, of Birmingham, &c. The *police*, in this sense, differ from the military, in being under the command of civil officers, but they are drilled and armed in a half military manner. Their object is both to prevent and detect crime; and they are either the ordinary *police*, dressed in uniform, or *secret* and *detective police*, who are not intended by their dress and manners to be distinguished from ordinary citizens: that the guilty may neither feel themselves safe from detection, nor be so. Such a secret force requires very careful regulation, or it might lead to great abuses. The metropolitan police of London amounts to upwards of 5000 men. The constabulary force of Ireland has more of a military character than city police; and amounted in 1850 to 12,000 men, at a cost of 560,000*l.* per annum.

POL'ICY, in Commerce, a written instrument containing the terms or conditions on which a person or company undertakes to indemnify another person against losses of property exposed to peculiar hazards, as fire, casualties at sea, &c. [See INSURANCE.]

POLIT'ICAL ARITH'METIC (*politikos*, belonging to the state: *Gr.*), the art of making arithmetical calculations on matters relating to a nation, its revenues, value of lands and effects, produce of lands or manufactures, population, and the general statistics of a country.

POLIT'ICAL ECON'OMY (same *deriv.*), the science which treats of the administration of the revenues of a nation; or the management and regulation of its resources, and productive property and labour. It is a term of very comprehensive meaning, and includes all the measures by which property and labour are directed in the best manner to the success of individual industry and enterprise, and to the public prosperity. Political economy considers the production and distribution not of those things which are merely useful, but of those which are of *value*. The air is very useful, but it commands no price; bread is useful, but its utility and its value are two different things. The wealth of a country, which forms the subject of political economy, consists in what is *capable of appropriation*. A thing may be very useful, but it may be attainable by every one—thus, the light of day. *Labour* is the only source of wealth, since it is the only source of value; it does not create matter, but it makes it suitable to our wants; and is required generally in a variety of ways—to appropriate the material, to convey it from place to place, and most usually to give it some peculiar form. As wealth depends on labour, everything that facilitates labour adds to the wealth of a country. But this is effected by a proper division of employments, and a judicious application of capital. *Division of employment* produces greater dexterity in the workmen; saves the time lost in passing from one occupation to another; and tends to facilitate the invention of useful machinery and advantageous processes of manufacture. But division of labour supposes a certain demand for the article manufactured. Ten or more men are employed to make one pin; but if all the pins which these ten men can manufacture are not required, the division of labour in this case is disadvantageous. Division of labour is useful, not only among individuals, but among provinces and countries; for one province or country may have greater facilities for producing one article, and another province or country for producing another. This leads to the conclusion, that facilities for intercourse between different countries, or parts of a country, are of deep importance. *Capital* consists of what is necessary for the support of human beings, or to facilitate production. Food, clothes, &c., which are required continually, constitute *circulating capital*; the tools, machines, &c., which are more slowly consumed, constitute *fixed capital*. The co-operation of both kinds of capital is required for the successful production of wealth. It has been said that the employment of machinery lessens the demand for labour. This may be true in a particular department, and temporarily; but the total employment of labour is increased by it. The introduction of locomotives threw the drivers of stage-coaches out of employment; but what an incalculably greater number of men do they cause to be employed in the preparation of materials, construction of machinery, and even in the staff of officials required by the rail ways!

POL'ITICS (*politeia*, civil polity: *Gr.*), in the most extensive sense, are the theory and practice of obtaining the ends of civil society; or the regulation and government of a nation or state, for the preservation of its safety, peace, and prosperity. Politics are necessarily divided into two branches; the one regarding a state in all its relations with other states, and the other its internal arrangements or *polity*. The latter includes what is frequently called its *domestic economy*, viz. the augmentation of its strength and resources, and the protection of its citizens in their rights, with the preservation and improvement of their morals.

POLL (*pol*, the head: *Sax.*—a register of heads), in elections, the register of those who give their vote, containing their name, place of residence, &c. Also the place where the votes are registered.

POL'LEN (fine flour: *Lat.*), in Botany, a fine powder contained in the anthers of flowers, and which being shed on the pistil, fructifies the ovary and causes it to produce fertile seeds. Each pollen grain is a cell which contains a granular semifluid matter called *fovilla*. Sometimes the exterior of the cell is prettily marked, but to see the markings requires a good microscope. In the tribe of orchids the pollen grains are joined together by viscid matter into masses called *pollinia*.

POL'LUX, in Astronomy, a fixed star of the second magnitude in the constellation Gemini, or the Twins.

POL'VERINE (*pulver*, dust: *Lat.*), in Chemistry, the calcined ashes of a plant brought from the Levant and Syria. In the manufacture of glass it is preferred to other ashes, as the glass made with it is perfectly colourless.

POL'Y (*polus: Gr.*), a prefix in a number of our words, signifying *many*; as in *polygon*, a figure of many angles.

POLYACOUS'TIC (*polus*, many; and *akoustikos*, belonging to hearing: *Gr.*), an epithet applied to that which multiplies or intensifies sound.

POLYADEL'PHIA (*polus*, many; and *adelphos*, a brother: *Gr.*), in Botany, the 18th class of the Linnæan system of plants, consisting of plants which have the stamens united into three or more bundles by the filaments.

POLYAN'DRIA (*polus*, many; and *anēr*, a male: *Gr.*), in Botany, the thirteenth class of the Linnæan system of plants, consisting of those whose hermaphrodite flowers have twenty or more separate stamens inserted on the receptacle, not on the calyx, as in *Icosandria*.

POLYAN'THUS (*polus*, many; and *anthos*, a flower: *Gr.*), a garden variety of the wild primrose.

POL'YCHROITE (*polus*, many; and *chroia*, colour: *Gr.*), in Chemistry, the colouring matter of saffron. It has received this name on account of the various colours it exhibits when acted on by reagents.

POLYCYSTI'NA (*polus*, many; *kustis*, a bag: *Gr.*), a tribe of minute marine animals of very low organization, allied to the *Foraminifera*, but inhabiting siliceous shells. These shells are of elegant and varied shape, and have large orifices through which the animal can protrude, at will, parts of its body, to collect food or to assist its movements.

POLYGA'MIA (*polus*, many; and *gamos*, marriage: *Gr.*), the 23rd class of the Linnæan system of plants, containing those with perfect flowers, accompanied by one or both sorts of imperfect flowers.

POLYG'AMY (*polugamia*, from same), a plurality of wives or husbands at the same time; the latter, however, is hardly included under the term, as it has scarcely ever been considered lawful. In some countries, Turkey for instance, polygamy is allowed; but, by the laws of England, polygamy is made felony, except in the case of absence beyond the seas for seven years. Polygamy prevailed among the Jewish patriarchs, both before and under the Mosaic law; but the state of manners had probably become reformed in this respect before the time of Christ, for in the New Testament we meet no trace of its practice. Polygamy has been allowed under all the religions which have prevailed in Asia. By the laws of Mohammed, every Mussulman is permitted to have a plurality of wives; the Arabs, however, seldom avail themselves of this privilege. The ancient Romans never practised it, though it was not forbidden among them; and Mark Antony is mentioned as the first who used the privilege of having two wives. From that time it became frequent in the Roman empire, till the reigns of Theodosius, Honorius, and Arcadius, who prohibited it, A.D. 393

POLYG'ENOUS (*polugenēs*, of many families: *Gr.*), consisting of many kinds, an epithet used in Mineralogy; as a *polygenous* mountain, one composed of strata of different species of stone.

POLYG'LOTT (*polus*, many and *glōtta*, a tongue: *Gr.*), a book containing many languages; as the *Polyglott Bible*, a bible printed in several languages

POL'YGON (*polus*, many; and *gōnia*, an angle: *Gr.*), in Geometry, a figure having many angles or whose perimeter consists of more than four sides. Every polygon may be divided into as many triangles as the figure has sides, and its area may therefore be easily measured.——POLYGONAL NUMBERS are so called because the units of which they consist may be disposed in such a manner as to represent several regular polygons. They are numbers forming arithmetical progressions. When their common difference is 1, the sums of the terms give triangular numbers—that is, numbers representing the points or angles in a series of triangles having a common vertex. When the common difference is 2, the sums of the terms give square numbers, which will represent the points or angles in a series of squares having a common angle. When the common difference is 3, the sums of the terms give a similar series of pentagons; and so on.

POL'YGON OF FOR'CES, in Mechanics, the theorem, 'If any number of forces acting at one angle of a polygon are repre-

sented by all the sides of the polygon taken in succession except one, that remaining side taken in the opposite direction will represent their *resultant*.'

POLYG'ONUM (*polugonos*, producing much: *Gr.*), in Botany, a genus of plants, nat. ord. *Polygonaceæ*. It includes the knot-grasses, bistorts, buckwheats, &c.

POL'YGRAM (*polus*, many; and *grammē*, a line: *Gr.*), a figure consisting of many lines.

POL'YGRAPH (*polus*, many; and *grapho*, I write: *Gr.*), an instrument for multiplying copies of a writing with ease and expedition.

POLYG'RAPHY (same *deriv*), the art of writing in, and deciphering, various ciphers.

POLYGYN'IA (*polus*, many; and *gunē*, a female: *Gr.*), in Botany, one of the Linnæan orders, containing plants the flowers of which have twenty or more styles.

POLYHAL'ITE (*polus*, much; and *hals*, sea-salt: *Gr.*), a mineral occurring in masses of a fibrous structure, a brick-red colour, and tinged with iron. It contains sulphates of lime, magnesia, and potash, with chloride of sodium or common salt.

POLYHE'DRON (*polus*, many; and *hedra*, a base: *Gr.*), in Geometry, a body or solid comprehended under many sides or planes. ——In Optics, a multiplying glass or lens, consisting of several plane surfaces disposed in a convex form.

POLYMIG'NITE (*polus*, much; and *mignumi*, I mix: *Gr.*), the name of a mineral found in Norway. It consists of titanic acid, zirconia, lime, yttria, oxides of iron, cerium, manganese, magnesia, potash, silica, and oxide of tin.

POL'YNOME (*polus*, many: *Gr.*; and *nomen*, a name: *Lat.*), in Algebra, a quantity consisting of many terms.

POLYOP'TRUM (*polus*, many; and *opteuo*, I see: *Gr.*), in Optics, a glass through which objects appear multiplied.

POLYPET'ALOUS (*polus*, many; and *petalon*, a leaf: *Gr.*), in Botany, having many petals.

POLYPH'ONY, or POLYPH'ONISM (*poluphōnia*: from *polus*, many; and *phōnē*, a voice: *Gr.*), multiplicity of sounds, as in the reverberations of an echo.

POLYPHYL'LOUS (*poluphullos*: from *polus*, many; and *phullon*, a leaf: *Gr.*), in Botany, many-leaved; as, a *polyphyllous* calyx or perianth.

POL'YPI (*polus*, many; and *pous*, a foot: *Gr.*), in Natural History, a term used synonymously with ZOOPHYTES [which see].

POLYP'ODY (*polupodion*: from *polus*, many; and *pous*, a foot: *Gr.*—from the roots having many tubercles like the feelers of a *polypus*), a fern belonging to the genus *Polypodium*. The common polypody is one of our most abundant ferns.

POL'YPUS, in Surgery, a fleshy tumour, commonly met with in the nose. It abounds in ramifications, from which it derives its name.

POL'YSCOPE (*polus*, many; and *skopeo*, I behold: *Gr.*), an optical instrument, consisting of a plano-convex lens, the convex surface of which is subdivided into several *facets*. Each of these will give a distinct image, and thus the object will appear in different places at the same time.

POLYSPERM'OUS (*poluspermos*, abounding in seed: *Gr.*), in Botany, an epithet for such plants as have several seeds.

POL'YSTYLE (*polustulos*: from *polus*, many; and *stulos*, a column: *Gr.*), a building surrounded by numerous columns, so that they cannot be readily counted at first view.

POLYSYL'LABLE (*polusullabos*: from *polus*, many; and *sullabē*, a syllable: *Gr.*), in Grammar, a word consisting of more syllables than three; for when a word consists of one, two, or three, it is called, respectively, a monosyllable, dissyllable, and trisyllable.

POLYSYN'DETON (*polusundetos*: from *polus*, much; and *sundetos*, bound together: *Gr.*), in Grammar and Rhetoric, a figure in which a redundancy of conjunctions, especially copulative ones, is used; as, 'We have armies and fleets, and gold and stores—all the sinews of war.'

POLYTECH'NIC (*polus*, many; and *technē*, an art: *Gr.*), an epithet denoting or comprehending many arts; as, a polytechnic school, a polytechnic gallery, &c.——The *Polytechnic School* of France was established by a decree of the National Convention of March 11, 1794, which was passed by the influence of Monge, Carnot, Fourcroy, &c., the committee of public safety having seen the necessity of providing for the education of engineers. Lagrange, Laplace, Berthollet, Fourcroy, and many other distinguished individuals, were its professors. Napoleon did much for it, and under him it received considerable modifications. The pupils were obliged to live in the building, and wear a uniform. Its object is to diffuse a knowledge of the mathematical, physical, and chemical sciences, and to prepare pupils for the artillery service and the various departments of engineering, military, naval, and civil. The inmates of this establishment fought bravely against the allies, March 30, 1814. In April, 1816, it was abolished, but re-established in September of the same year.

POL'YTHEISM (*polus*, many; and *theos*, a god: *Gr.*), the doctrine and worship of a plurality of gods; opposed to *monotheism*, or the belief in one Supreme Being.

POMA'CEÆ (*pomum*, fruit, but particularly an apple: *Lat.*), a nat. ord. of plants, including the apple, pear, medlar, and quince.

POMA'TUM (*Lat.*, from *pomum*, fruit—sometimes used in making it), a compound of jessamine, orange, &c., with lard and rose-water; an unguent used in dressing the hair.

POM'EGRANATE (*pomum granatum*, fruit having many seeds: *Lat.*), in Botany, the fruit of a tree belonging to the genus *Punica*, nat. ord. *Myrtaceæ*, a native of the south of Europe. It is as large as an orange, is of a reddish colour, and has a hard rind filled with a soft pulp and numerous seeds.

POMIF'EROUS (*pomum*, fruit; and *fero*, I bear: *Lat.*), fruit-bearing; an epithet applied to plants which bear pomes, that is fruits like the apple, pear, and quince.

POMOL'OGY (*pomum*, fruit: *Lat.*; and *logos*, a discourse: *Gr.*), that branch of gardening which is directed principally to the cultivation of fruit-trees, shrubs, &c. In Germany and France there exist many pomological societies, upon a similar principle to our horticultural, though the former, as the name implies, direct their attention chiefly to the cultivation of fruits.

POM'PA CIRCEN'SIS (the Circensian procession: *Lat.*), in Antiquity, a solemn march of the persons who were to engage in the exercises of the circus, attended by the magistrates and ladies of quality; the statues of the gods and illustrious men were carried along in state, on wagons called *thensæ*, from the shrines to the *pulvinaria*, and, when the games were over, back again.

PO'MUM A'DAMI (Adam's apple: *Lat.*), in Anatomy, the name of a protuberance in the anterior part of the neck, so named from the whimsical supposition that a part of the forbidden fruit of which Adam ate stuck in his throat, and thus caused it.

PONTEE', in glass works, an iron instrument used for taking the hot glass out of the pot.

PON'TIFEX (*Lat.*: from *pons*, a bridge; and *facio*, I make—probably because originally the construction and preservation of bridges were a part of his duties), among the Romans, one of those priests who had the superintendence and direction of divine worship in general. The pontifices, at first, were only four in number, but were made fifteen by Sulla, and sixteen by Julius Cæsar—including the pontifex maximus. The latter was always chosen from those who had borne the highest dignities in the state; and the office was conferred for life. There were other pontiffs who were termed *minores* (lesser): they were probably the secretaries of the higher order. The Roman emperors assumed the right of appointing as many pontifices as they pleased, which diminished the splendour of the pontifical college; and they retained for themselves the office of pontifex maximus (supreme pontiff), which was one of great dignity and power, as it gave the supreme, direct control over religious matters, and great indirect influence in all others.

PON'TIFF (from last), in the Roman Catholic and Greek churches, a bishop. The pope is termed *sovereign pontiff*. The Jews had their pontiffs or *chief priests*. *Pontificate* is used for the state or dignity of a pontiff, or high priest; but more particularly for the reign of a pope.

PONTIFICA'LIA (pertaining to a pontiff: *Lat.*), the robes in which a bishop performs divine service.

PONTOO'N BRIDGE (*ponton*: *Fr.*), a floating bridge, formed of flat-bottomed boats or pontoons, anchored or made fast in two lines, and used in forming bridges over rivers for the passage of armies.——PONTOON CARRIAGE, a vehicle formed of two wheels only, and two long side pieces, whose fore-ends are supported by timbers.

PONT-VOLANT' (a flying bridge: *Fr.*), in Military affairs, a kind of bridge used in sieges for surprising a post or outwork that has but a narrow moat. It is composed of [illegible] and so contrived that, by the aid of ropes and pulleys, the upper may be pushed forward till it reaches the destined point.

POOR and POOR LAWS (*pauvre*: *Fr.*). [See PAUPERISM.]

POPE (*papa*, a father: *Lat.*), the head of the Roman Catholic church. The appellation of *pope* was anciently given to all Christian bishops; but about the latter end of the 11th century, in the pontificate of Gregory VII., it was claimed as the exclusive title of the bishop of Rome, whose peculiar title it has ever since continued. The spiritual monarchy of Rome sprang up soon after the declension of the Roman empire. The bishops of Rome affect to owe their origin to the appointment of St. Peter, who was considered as transferring the keys of heaven (figuratively consigned to his keeping) to them as his successors; hence they assumed a supremacy which was admitted by all the western Christians, but resisted by the eastern, who, in Greece, Turkey, and Russia, constitute a separate church, termed *Greek*, in distinction from that of the west, termed *Latin*. The vices of the clergy led, however, in the 14th and 15th centuries, to schisms; and a personal quarrel between the pope and Henry VIII. of England induced the latter to assume the title of the head of the Anglican church. The *Reformation* took place at that period, and its principles were adopted by many German princes, and by the northern sovereigns. The pope retains his spiritual ascendency throughout Italy, France, Belgium, Austria, Spain, and Portugal; and four-fifths of the Irish are Roman Catholics. He is a temporal prince, but his dominions are now reduced to the sovereignty of Rome, and a few provinces around that city. On the death of a pope his successor is appointed from amongst the cardinals by the cardinals assembled in conclave. There are four modes of election:—1. By *inspiration*, when a number of cardinals call out a name as if on the impulse of the moment and under the direction of God. 2. By *compromise*, when after long deliberation without result the cardinals agree to leave the nomination to one of their number. 3. By *scrutiny* or *ballot*, when each cardinal writes the name of his nominee on a ticket which is deposited in a consecrated chalice. If, on an inspection of these tickets, it is found that any cardinal has obtained two-thirds of the votes, he is considered to be elected. If no one has received the requisite number of votes, there remains another mode of proceeding: 4. By *access*, when any cardinal accedes to the vote of another, and alters his ticket accordingly so as to give the nominee the number of votes required.——Priests in the Greek church are termed *Popes*.

POP'LAR (*peuplier*: *Fr.*; from *populus*: *Lat.*), the name of trees belonging to the genus *Populus*, nat. ord. *Amentaceæ*. The commonest species in Britain are the black poplar (*P. nigra*), the white poplar or Abele

(*P. alba*), and the Lombardy poplar (*P. fastigiata*). The aspen (*P. tremula*) belongs to the genus.

POP'LIN, in Commerce, a kind of fine-woven stuff made of silk and worsted.

POP'PY (*popig: Sax.*), the name of plants belonging to the genus *Papaver*. From one species, *P. somniferum*, or white poppy, opium is collected. [See OPIUM.]

POPULA'RES (*Lat.*, from *populus*, the people), the name of a party at Rome, who struggled to ingratiate themselves with the people, and sought, by extending the influence and power of the latter, to increase their own. The *Populares* were opposed to the *Optimates*. [See OPTIMATES.]

POPULA'TION (*populatio*, from same), the aggregate number of people in any country. Owing to the progressive increase of births over deaths, the population is continually augmenting in most parts of the habitable world. 'Countries,' says Adam Smith, in his 'Wealth of Nations,' 'are populous, not in proportion to the number of people whom their produce can clothe and lodge, but in proportion to that of those whom they can feed.' A notion formerly existed that an increase of population was necessarily an advantage to a country; but it is now admitted that the increase is beneficial only when accompanied by an increase in the means of subsistence.

Population of England and Wales, from the year 1700 *to* 1861.

Year.	No. of Persons.	Year.	No. of Persons.
1700 . .	5,475,000	1790 . .	8,675,000
1710 . .	5,240,000	1801 . .	9,168,000
1720 . .	5,650,000	1811 . .	10,502,500
1730 . .	5,769,000	1821 . .	12,218,500
1740 . .	6,064,000	1831 . .	14,594,500
1750 . .	6,467,000	1841 . .	15,914,000
1760 . .	6,736,000	1851 . .	18,000,000
1770 . .	7,428,000	1861 . .	20,228,497
1780 . .	7,953,000		

Scotland.

1801 . .	1,652,400	1841 . .	2,365,114
1811 . .	1,865,900	1851 . .	2,870,784
1821 . .	2,135,300	1861 . .	3,096,808
1831 . .	2,365,807		

Ireland.

1821 . .	6,846,949	1851 . .	6,515,794
1831 . .	7,767,401	1861 . .	5,850,309
1841 . .	8,175,238		

Total population of the United Kingdom in 1861 . . 29,321,288

Dividing the population into 100 parts, England and Wales have 69 parts, Scotland 10½ parts, and Ireland nearly 20, and the islands in the British seas have half such a part.

Increase per cent. of the population of Great Britain at periods between 1700 *and* 1851.

Between	1801	and	1811 . . .	14	per cent.
"	1811	"	1821 . . .	17¾	"
"	1821	"	1831 . . .	14	"
"	1700	"	1851 . . .	175	"
"	1851	"	1861 . . .	12	"

During the interval between 1851 and 1861 more than 2,050,000 British subjects emigrated to distant places. The population of 1801 doubled its numbers in 1852, but at the rate of increase during the last decennial period the population would double itself in 52 years. The boys born in England are in the proportion of 104,811 boys to 100,000 girls, but from various causes the males become reduced in number, and the census of 1861 gave 10,289,965 females to 9,770,259 males. The number of families in 1861 was 4,491,524, and the average number of persons in two families was about nine. It was found that there were on the average 344 persons to each square mile.——POPULATION OF THE WORLD. The human race is thought to comprise about 1000 millions of living persons, speaking 3064 languages and professing 1100 forms of religion. The average duration of human life is estimated at 33⅓ years. One-fourth of the children born die before their seventh year, and one half before their seventeenth. About 330 millions of persons die every year, or one every second.

POR'CELAIN (*porcelaine: Fr.*), a fine sort of earthenware, originally manufactured in China, and thence called *china-ware*. It is supposed to have been invented before our era. A combination of silex and alumina is the basis of porcelain; and with the addition of various proportions of other earths, and even of some metallic oxides, it forms the different varieties of pottery, from the finest porcelain to the coarsest earthenware. Though siliceous earth is the ingredient which is present in large proportion in these compounds, it is the argillaceous which more particularly gives them their character; for this communicates plasticity to the mixture when soft, so that it may be moulded in any way, or even turned into any shape on the lathe, and renders it capable of being baked. *Porcelains* differ much in their fineness and beauty. They are either of the *pâte dur* or *pâte tendre*, the hard quality being the oldest. *Egg-shell porcelain* is so called from its extreme thinness. *Cracklin porcelain* has a curious appearance, due to a cracking of the glaze in all directions, and a filling-up of the cracks with a dark pigment. [See CHINA-WARE, EARTHENWARE, &c.]

PORCEL'LANITE, a species of jasper, a siliceous mineral of various colours. It is sometimes marked with vegetable impressions of a brick-red colour, and seems to be formed accidentally in coal-mines which have indurated and semi-vitrified beds of coal-shale or slate-clay.

PORCH (*porche: Fr.*; from *porticus: Lat.*), in Architecture, a kind of vestibule supported by columns, at the entrance of temples, halls, churches, or other buildings.——A public portico in Athens, where Zeno the philosopher taught his disciples, was called, by way of distinction, the *porch* (*Stoa*). Hence, *the porch*, in classical literature, is equivalent to the *school of the Stoics*.

POR'CUPINE (*porc*, a hog; and *épine*, a thorn: *Fr.*), the name of some rodent quadrupeds belonging to the genus *Hystrix*. The common porcupine (*H. cristata*) is a native of Asia and Africa. Its foreteeth are obliquely truncated, and it has no canine teeth; its ears are of a roundish form, and the body is covered with prickles or spines, and also with bristles like those of a hog. The spines, or quills, as they are also called, are of two kinds; some being short, thick, strong, and sharp-pointed; others longer, weaker, more flexible, and compressed at the point. The porcupine is capable of erecting them if attacked or in danger; but not of projecting them, as is sometimes stated. It is a burrowing animal, and its habits are nocturnal. It feeds on vegetables.

PORE (*Fr.; from poros*, literally a passage: *Gr.*), a small aperture in the skin for perspiration; so fine as to be invisible except by microscopes of great power, and so numerous that thousands of them exist within a very small space.——Also, a small opening in other organic bodies; as the *pores* in plants.

PO'RISM (*porisma*, from *porizo*, I deduce: *Gr.*), a corollary; a name given by ancient geometers to certain propositions, which partake of the nature of both problems and theorems. The *porism* asserts that a certain problem may become indeterminate, and so far it partakes of the nature of a theorem; in seeking to discover the conditions by which it may be effected, it partakes of the nature of a problem.

POR'PHYRY (*porphurites*, literally purple-coloured: *Gr.*), in Mineralogy, a rock composed of an earthy or compact base through which distinct crystals are disseminated. It is of igneous origin, usually very hard, and susceptible of a fine polish. The term was originally applied to the extremely hard stone found in Egypt, of various shades, from a violet to a claret colour, variegated with white, the well-known *Rosso antico*. The extensive quarries from which the Romans obtained the porphyry they caused to be worked up into baths, columns, tazze, and architectural ornaments, were situate in a mountain now called Gebel Dokhan, which rises in the eastern desert of Upper Egypt between the Nile and the Gulf of Suez. It is probable that the greater part of a year was consumed in transporting an object from the quarries to Rome. They are now entirely deserted.

POR'POISE (*porc*, a hog; and *poisson*, a fish: *Fr.*), the name of cetaceous mammals, belonging to the genus *Phocæna*, and allied to the dolphins. The common porpoise is known to every voyager, being frequently seen in packs, rolling over and over as they swim after shoals of herring and mackarel, which they drive before them. It also seeks food by rooting with its snout like a hog in the sand and mud. Its tough skin is of a bluish black colour, and this can be tanned and usefully applied. The blubber yields a pure oil.

PORT (*Fr.; from portus: Lat.*), a haven, cove, inlet, or recess of the sea; in short, any commodious place situated on the sea-coast, or at the mouth of a river, screened from the wind, with depth of water sufficient for ships of burden, and where vessels may safely unload their cargoes. The word *port* is generally applied to spacious harbours much resorted to by ships, as the *ports* of London and Liverpool; and they may be either natural or greatly improved by art.——PORT, a kind of wine made in Portugal: so called from *Oporto*.

PORT'AGE (*Fr.*, from *porter*, to carry), a place on the rivers in Canada, where rapids or cataracts prevent the passage of boats, and where, therefore, travellers are obliged to carry their goods over land until the stream becomes again navigable.

PORTCUL'LIS (*portecoulisse: Fr*), in Fortification, a machine like a harrow, hung over the gateway of a fortified town. It is let down, in case of surprise, to prevent the entrance of an enemy.

POR'TER, a kind of malt liquor made of high-dried malt, and characterized by its dark brown colour, its peculiar aromatic flavour, and its tonic and intoxicating qualities. Before the year 1730, the malt liquors in general use in London were ale, beer, and twopenny; and it was customary for the drinkers of malt liquor to call for a pint, or tankard, of half and half, that is, a half of ale and a half of beer, a half of ale and half of twopenny, or half of beer and half of twopenny. In course of time, it also became the practice to call for a pint, or tankard, of *three threads*, meaning a third of ale, of beer, and of twopenny; and thus the publican had the trouble to go to three casks and turn three cocks for a pint of liquor. To avoid this inconvenience and waste, about 1722 a liquor was made which should partake of the united flavours of ale, beer, and twopenny, which was called *entire* or entire-butt; and as it was a very exhilarating and nourishing liquor, it was very suitable for *porters* and other working people: hence it obtained its present name. Some brewers colour their porter with burnt sugar; but in general they concentrate a quantity of their first and best wort to an extract in an iron pan, and burn this into a *colouring stuff;* by which they can lay claim to the merit of using nothing in their porter but malt and hops.

PORT'-FIRE, in Gunnery, a paper tube, about ten inches in length, filled with a composition consisting of meal-powder, sulphur, and nitre, rammed moderately hard. It is used with guns and mortars instead of a match.

PORT'GLAIVE (*porte-glaive*, a sword-bearer: *Fr.*), one who formerly carried the sword before a prince or governor.

PORT'GREVE, or PORT'REEVE (*port*, a harbour; and *gerefa*, a governor: *Sax.*), in former times, the chief magistrate of a port or maritime town. This officer is now styled either mayor or bailiff. According to Camden, the chief magistrate of London was anciently called *portgreve*, but that officer was changed by Richard I. for two bailiffs; and these gave place in the reign of John to a mayor.

PORT'HOLES, the openings or embrasures in the sides of ships of war, through which guns are run out.

POR'TICO (*Ital.; from porticus: Lat.*), in

Architecture, a range of columns supporting a roof, and affording a space where people may walk under cover. Though this word is ultimately derived from *porta*, a gate or door, it is used for any arrangement of columns which forms a gallery.——The Athenians were magnificent in their porticos. Poets and philosophers recited their works and held their disputations in them. Their most famous portico was that called *Pœcile*, which was, in fact, a picture gallery, adorned with the works of the greatest masters.——The word *portico* is sometimes applied to any place for walking under shelter, though constructed with arches; but it is more accurately confined to a projection in front of a building, supported on columns.

PORT'LAND STONE, a granular limestone, belonging to the upper portion of the *oolite* formation, obtained in the isle of Portland, on the coast of Dorsetshire.

PORT'LAND VASE, a celebrated cinerary urn, found in the tomb of the emperor Alexander Severus, and his mother Mammæa. It was first in the possession of the Barberini family at Rome; whence it came into that of the Portland family, who, in 1810, deposited it in the British Museum. It is said to be of glass, is of a deep blue colour, and the figures are white. Wedgwood made a number of copies of it closely resembling the original.

POSE' (placed: *Fr.*), in Heraldry, a lion, horse, or other beast, standing still, with all his four feet on the ground.

POSI'DEUM, or POSI'DEON (*Poseideōn*: *Gr.*), in Ancient Chronology, the sixth month of the Athenian year, which consisted of thirty days, and answered to the latter part of December and beginning of January. The name was due to a festival in honour of Neptune Posidonius, which was celebrated during that month.

POSI'TION (*positio*, a placing: *Lat.*), in Arithmetic, called also the *rule of false*, a rule which, by the use of one or more assumed but false numbers, enables us to find the number sought.——POSITION, in Geometry, is a term sometimes used in contradistinction from *magnitude*; thus, a line is said to be given in position when its situation, bearing, or direction, with regard to some other line, is defined; on the contrary, a line is given in magnitude when its length is stated but not its situation.——POSITION, in Logic, the groundwork or proposition on which an argument is raised.

POS'ITIVE (*positus*, placed: *Lat.*), a term of relation sometimes opposed to *negative*; hence, a positive quantity, in Algebra, is a quantity opposed to that which is negative. Thus, if the latter represent a *debt*, a positive quantity will represent money in *possession*, or to which one has a *claim*; if it represent motion towards the *south*, a positive quantity will represent motion towards the *north*. Negative quantities are just as real as positive, and it is absurd to suppose that in any case they can be *less* than nothing. If I owe money beyond what I am able to pay, my condition is *negative*, and I am worse off than if I simply possessed nothing—the debt is a *reality*. If I intend to go *westward*, and by mistake go *eastward*, my position with regard to my destination has become *negative*, but the distance traversed by mistake is a *reality*. *Positive quantities* are designated by the character + prefixed or supposed to be prefixed to them.——POSITIVE DEGREE, in Grammar, the adjective in its simple signification, without comparison or relation to increase or diminution: as, *good*, *bad*, &c. ——POSITIVE ELECTRICITY, a term applied to the electricity of bodies supposed to contain more than their natural quantity. *Positive* electricity, being that produced by rubbing glass, is called also *vitreous*; *negative* electricity, produced by rubbing amber or resin, being called *resinous*.

POSOL'OGY (*posos*, how much? and *logos*, a statement: *Gr.*), in Medicine, the science or doctrine of preparing and administering doses.

POS'SE COMITA'TUS (*posse*, to be able; and *comitatûs*, belonging to the county: *Mod. Lat.*—the *power of the county*), in Law, the armed power of the county, or the attendance of all persons charged by the sheriff to assist him in the suppression of riots, &c. It includes all males above fifteen years of age within the county, except ecclesiastical persons, peers, and such as labour under any infirmity.

POSSES'SION (*possessio*: *Lat.*), in Law, the holding or occupying of anything, either *de jure* or *de facto*. Possession *de jure* is the title a man has to enjoy a thing, though it is in the actual possession of another; or the title which a person has when lands are descended to him and he has not yet entered into them. Possession *de facto*, or actual possession, is where there is an actual and effectual enjoyment of a thing. Long undisturbed possession is presumptive proof of right or property in the possessor.

POSSES'SIVE CASE (*possessivus*, relating to possession: *Lat.*), in English Grammar, the *genitive case*, or case of nouns and pronouns, which either denotes ownership, as *John's* book (a book belonging to John); or some relation of one thing to another, as *Byron's* admirers (those who admire the writings of Byron).

POST (*after*), a Latin preposition used in composition with several English words, and generally implying a relation of posteriority.

POST (*poste*: *Fr.*), a messenger or carrier of letters; one that goes at stated times to convey the mail and despatches.——A military station.——A public office or employment.——The name of a sort of writing-paper much used for letters.——*To ride post* is to be employed to carry despatches and papers, and consequently to ride with speed. Hence, *to travel post* is to travel expeditiously by the aid of fresh horses taken at certain stations.——*To post*, in Book-keeping, is to carry accounts from the waste-book or journal to the ledger.

POST'AGE (same *deriv.*), the duty or charge imposed on letters or parcels conveyed by post. This charge is at present only *one penny* for each letter not exceed ing half an ounce in weight, from any part of Great Britain and Ireland to any other part, and in proportion for other weights. Great facilities are now afforded, at very moderate rates, for the transmission of books, and also of money.

PO'ST-DATE, to date after the real time; as to *post-date* a bill or a contract, that is, to date it after the true time of drawing the one or making the other. There is a penalty of 100*l.* for post-dating bills, &c., on stamps which do not cover the real term. Bankers' cheques must not be post-dated unless on a bill stamp, under the same penalty.

POST-DISSE'ISIN, in Law, a writ which was formerly issued for the purpose of putting in possession a person who had been disseised after a judgment to recover the same lands of the same person, under the statute of Merton.

POS'TEA (afterwards: *Lat.*), in Law, the return of a record of the proceedings in a cause, after a trial and verdict by writ of *nisi prius*, into the court after a verdict. The entry of the result of the trial upon the record commences with this word

POS'TERN (*posterne: Fr.*), in Fortification, a small gate, usually in the angle of the flank of a bastion, or in that of the curtain descending into the ditch.

POST'HUMOUS (*posthumus:* from *post*, after; and *humus*, the earth: *Lat.*—after interment), born after the death of a father. Also, published after the death of the author; as *posthumous works.*

POS'TIL (*postilla*, afterwards: *Lat.*), a marginal note; originally, a note in the margin of the Bible; so called because written after the text.

POSTLIMIN'IUM (*Lat.:* from *post*, after; and *limen*, the threshold), among the Romans, the return to his own country of a person who had gone to sojourn in a foreign country, or who had been banished or taken by an enemy.——In the modern law of nations, the right of *postliminy* is that by virtue of which persons and things taken by an enemy in war are restored to their former state, when coming again under the power of the nation to which they belonged. But this cannot extend in all cases to personal effects, on account of the difficulty of ascertaining their identity.

POST'MASTER, the officer who has the superintendence and direction of a post-office.——The *postmaster-general* is the chief officer of the post-office department, whose duty is to make contracts for the conveyance of the public mails and see that they are executed; and who receives and is accountable for the moneys arising from the postage of letters, pays the expenses, and superintends the whole. It is usual to appoint a peer to this office, and he retires with the ministry. The chief secretary is the person by whom the duties are principally performed.

POST MOR'TEM (after death: *Lat.*), an epithet applied to an inspection and examination of the body of a deceased person, for the purpose of ascertaining the cause of death.

POST'-NOTE, in Commerce, a bank-note intended to be transmitted to a distant place by the public mail, and made payable to *order;* differing in this from a common bank-note, which is payable to the *bearer.*

POST'-OFFICE, an establishment for the reception, conveyance, and delivery of letters, &c. Posts were established for the first time in modern Europe by Louis XI. of France, in 1479; and were originally intended to serve merely for the conveyance of public despatches, and of persons travelling by authority of government. But the great convenience afforded to individuals, particularly as commercial transactions multiplied and extended, by a safe, regular, and speedy communication between distant parts of the country, induced the government to convert it into a source of public revenue. In 1635, Charles I. erected a letter-office for England and Scotland; it extended to only a few of the principal roads, the times of carriage were uncertain, and the postmasters on each road were required to furnish horses for the conveyance of the letters at 2½*d.* a mile. The plan did not eventually succeed; but it led to an establishment for the conveyance of letters to all parts of the kingdom, weekly, in 1649, under the commonwealth. In 1657, the post-office was established very nearly as it was before the recent changes; and the rates of postage that were then fixed were continued till the reign of queen Anne. But instead of improving, the post gradually became less expeditious; and in 1784, when a journey from London to Bath was made by the diligences in 17 hours, the post took 40 hours! and on other roads the rate of travelling bore about the same proportion. Under these circumstances, it occurred to Mr. John Palmer, of Bath, comptroller general of the post-office, that a very great improvement might be made in the conveyance of letters, in respect of economy, as well as of speed and safety, by contracting with the proprietors of the coaches for the carriage of the mail: the latter being bound to perform the journey in a specified time, and take a guard with the mail for its protection. Railways have increased in an extraordinary degree the speed with which letters are transmitted. The journey from London to Liverpool, by the mail coach, took about *twenty-two* hours: it is now accomplished in *eight* or less. The Post-office Act (1839), which recognizes the expediency of one uniform postage, is now in operation; the rate being one penny for all inland letters not exceeding half an ounce in weight; twopence for those not exceeding one ounce; fourpence for those not exceeding two ounces; and so on, if not exceeding sixteen ounces, except in certain specified cases. Newspapers require only a penny stamp for transmission from one part of Great Britain to another; they must be open at each end; any writing or enclosure subjects them to a treble postage. They require only the same stamp when sent to the British colonies, if put into a post-office within fifteen days of publication; or if sent to countries with which there is a postal arrangement

Books and deeds may now also be sent to all parts of the empire and the colonies, if enclosed in envelopes open at each end, at very moderate rates; and probably the *penny postage* scheme will soon be extended to all parts of the civilized world. The heavy postage was to a great extent evaded [see FRANKING]; nevertheless the revenue has not yet been benefited by the change. In 1838 the net receipt from the post-office was 1,659,510*l*., in 1865 it was only 1,500,000*l*.

POST'SCRIPT (*postscribo*, I write after: *Lat.*), an addition made to a letter after it is concluded and signed by the writer.——Also, any addition made to a literary performance after it has been supposed to be finished, containing something omitted or something which subsequently occurs to the writer.

POST'ULATES (*postulatum*, a demand: *Lat.*), fundamental principles in any art or science, which are too simple and obvious to need demonstration, and are therefore assumed or taken for granted.

POTAR'GO, a kind of pickle imported from the West Indies.

POT'ASH (*potasse: Fr.*), in Chemistry, the name of a vegetable fixed alkali. It is procured, in an unrefined state, from the ashes of certain plants, by lixivation and evaporation; the residue after evaporation is purified in a crucible or furnace, and the extractive substance burnt off or dissipated. Refined potash is called *pearlash*; it is an impure carbonate of *potassa*. [See next.]

POTAS'SIUM, in Chemistry, a substance procured by passing a galvanic current through potash, of which it is the metallic basis, and still more conveniently by other means. It is remarkable for its low spec. grav., which is only 0·865; it is therefore lighter than water, and, when thrown into that fluid, it takes fire spontaneously on account of its extraordinary affinity for oxygen, and floats about in a state of ignition. At the ordinary temperature of the atmosphere it is solid; at 80° it becomes soft; and at 150° liquid, in which state it resembles mercury in appearance. In the atmosphere it rapidly absorbs oxygen, and becomes protoxide or *potassa*: heated in oxygen, it becomes *peroxide*, which is at once changed by water into the protoxide. The latter is as a *hydrate* in what is called *caustic potash*; which may be obtained by removing the carbonic acid from the carbonate with caustic lime and water, evaporating the solution, and fusing the residue. Potassium burns with great splendour in chlorine. It must be kept immersed in naphtha, or some other fluid containing no oxygen, or it will speedily lose its metallic state. As potassium has the most powerful affinity for oxygen of all substances known, it takes it from every other compound, and hence is a most important agent in chemical analysis.

POTA'TO, the wholesome and nutritive root of the *Solanum tuberosum*, a native of America. It was introduced into the British dominions by Sir Walter Raleigh in the 16th century.

POTEN'TIAL MOOD, in Grammar, that form of the verb which is used to express the possibility of an action, as, I *may* go, he *can* sing.

POT'STONE, in Mineralogy, a tough variety of steatite, the *Lapis ollaris* of Pliny. It is sometimes made into culinary vessels.

POT'TERN ORE, in Mineralogy, a species of ore which has been so called by the miners on account of its tendency to vitrefy like the glazing of potter's ware.

POT'TERY, the manufacture of earthen pots, or earthenware in general, but particularly of the coarser species. The better kinds of pottery, called in this country *Staffordshire ware*, are made of an artificial mixture of alumina and silica; the former obtained in the form of a fine clay, chiefly from Devonshire; and the latter consisting of chert or flint, which has been heated red-hot, and quenched in water. Each material, carefully powdered and sifted, is diffused through water, mixed by measure, and brought to a due consistency by evaporation, it is then highly plastic, and is formed upon the potter's wheel or lathe into various circular vessels, or moulded into other forms, which, after having been dried in a warm room, are enclosed in baked clay vessels, resembling band-boxes, and called *seggars*; these are ranged in the kiln so as nearly to fill it, leaving only space enough for the fuel; the ware is kept red-hot for a considerable time, and is thus brought to the state of *biscuit*. This is afterwards *glazed*; which is done by dipping it into a mixture of about 60 parts of litharge, 10 of clay, and 20 of ground flint, diffused in water to a creamy consistence; when taken out, enough adheres to the piece to give a uniform glazing, when it is again heated. The pieces are then again packed up in the seggars, with small bits of pottery interposed between them, and fired in a kiln as before. The glazing mixture fuses at a very moderate heat, and gives a uniform glossy coating, which finishes the process when ordinary white ware is to be made. [See EARTHENWARE.] The blue patterns, so common on account of the facility with which cobalt is applied, are generally first printed on paper, which is attached to the article while it is in the state of biscuit, and the colour transfers itself when heat is applied; other mineral substances are sometimes put on in the same way. The work of the porcelain manufacturer is one which requires great skill, and is highly interesting; his art owes more to chemistry than perhaps any other.

POUL'PE. [See OCTOPUS.]

POUNCE (*ponzone: Ital.*), gum-sandarach pulverized; a fine powder used to prevent ink from spreading on paper. There is also a kind of *pounce*, used by embroiderers and lace-makers, which consists of coloured powders enclosed in muslin, &c. It is passed over holes pricked in the work, to mark the lines or designs on a paper underneath.——POUNCES, in Falconry, the talons or claws of a bird of prey.

POUND (*pund: Sax.; from pondus*, a

weight: *Lat.*), a weight containing 12 ounces troy, and 16 avoirdupois. It also denotes a money of account; so called because the ancient pound of silver weighed a pound troy.——Pound (*pynan*, to confine: *Sax.*), any enclosed place, erected by authority, in which cattle are confined when taken trespassing, or going at large, in violation of law. A common pound is kept in every township, lordship, or village; and it is said there ought to be one in every parish, the want of which is punishable in a court-leet. The pound-keeper is bound to receive any animal brought to him, and is not answerable if it is illegally impounded.

POURPRES'TURE (*pourpris*, an enclosure: *Fr.*), in Law, the appropriation of anything which ought not to be appropriated; but specially any encroachment on a highway, by the erection of a shed, or the making of a projecting window, &c.

POW'ER (*pouvoir: Fr.*), in Mechanics, signifies those simple mechanical contrivances intended to render power more effective. Also, any force which, applied to a machine, sets it in motion. The use in mechanics of the word *power* in two senses is productive of some inconvenience. In the former sense there are six mechanical powers, reducible to two: the lever, pulley, and wheel and axle, reducible to the *lever*; the inclined plane, wedge, and screw, reducible to the *inclined plane*. In the latter, there are many powers: gravity, acting in the form of weights; elasticity, in springs; the strength of animals; wind, water, heat—particularly in the application of steam. A power is rarely suited precisely to the production of the effect intended. The action of gravity is modified by the pendulum; the varying force of a spring, by the fusee; the reciprocating motion imparted by steam is changed by the crank into rotary; and the irregularities of the crank itself are corrected by the fly-wheel.——Power, in Arithmetic and Algebra, the product of any quantity multiplied by itself some number of times. Thus, the second power or square of 5 is 25, or 5 multiplied by 5; the third power or cube of *a* is the product of three *a*'s multiplied together, briefly expressed by a^3, &c.

POW'ER OF ATTOR'NEY, in Law, an instrument by which one party empowers another to perform certain acts for him, either generally or for a particular purpose.

POW'ERS, GREAT, of Europe, in Diplomacy, England, France, Austria, Russia, and Prussia.

POW'TER, an appellation given to a certain kind of pigeon which has a habit of swelling up its neck when it is displeased.

POY'NING'S LAW. Several laws were called by this name; but the most important was an act of parliament made under Henry VII., by which the law of England became in force in Ireland. It derived its name from Sir Edward Poyning, then lord-lieutenant of Ireland.

PRAC'TICE, in Arithmetic, a rule which abridges the operations in proportion, by facilitating the multiplication of quantities containing different denominations: as pounds, shillings, pence, &c.; yards, feet, inches, &c.——Practice of the Courts, in Law, the form and manner of conducting or carrying on suits at law or in equity.

PRÆ-AD'AMITES, those who are supposed, by some writers, to have inhabited the earth before Adam.

PRÆ'CIPE IN CAP'ITE, in Law, a writ issuing out of the court of chancery, for a tenant who held of the king in chief, as of his crown, and not as of any honour, castle, or manor.

PRÆCIPITA'TIO de Robore (*Lat.*), in Antiquity, a capital punishment among the Romans, which consisted in throwing the criminal headlong from that part of the prison which was called the *robur*.

PRÆCOG'NITA (*Lat.*), things which are to be previously known in order to understand something else. Thus, a knowledge of the structure of the human body is one of the *præcognita* of medical science and skill.

PRÆ'FECTURE (*præfectura: Lat.*), in Antiquity, an appellation given to certain towns in Italy, whose inhabitants had the name of Roman citizens, but were not allowed to enjoy either their own laws or magistrates, being governed by annual prefects sent from Rome. These were generally such places as were suspected, or had in some way or other incurred the displeasure of the state. The title of prefect (*præfectus*) was given to many officers in ancient Rome.

PRÆMUNI'RE (for *præmoneri*, to be forewarned: *Lat.*), in Law, a species of offence, consisting of a contempt of the king and his government. It derives its name from the words at the beginning of the writ issued preparatory to prosecution, *promoneri* or *præmoneri facias* (you will cause to be warned). The first statute of this nature was passed in the reign of Edward I., to restrain the encroachments of the Roman Catholic clergy; and others were subsequently enacted, previous to the reformation, relating to the assumption of authority in England by virtue of papal and other foreign provisions. But later statutes under this name affect very miscellaneous acts; and among them, the refusing to take the oaths of allegiance and supremacy, &c.

PRÆNO'MEN (*præ*, before; and *nomen*: *Lat.*), that name among the ancient Romans which, like our Christian name, stood before the *gentile* or family name, and served to distinguish brothers, &c., from each other; as Caius, Lucius, Marcus, Julius, &c. Care was generally taken, in conferring the *prænomen*, to give that of the father to the eldest son, that of the grandfather to the second, and so on. The *prænomen* was not brought into use till long after the *nomen*, or family name. The word was also used to indicate a *title* prefixed to a name.

PRÆTEX'TA, or Toga Prætexta (*Lat.*, from *prætexo*, I border), a long white robe, with a broad purple border, originally appropriated to the Roman magistrates and some of the priests, but afterwards worn by children of quality—by boys till the age of seventeen, when they assumed the *toga virilis*; and by girls till they were married.

PRÆ'TOR (*Lat.*, for *præitor*, from *præeo*, I precede), a chief magistrate among the Romans, instituted for the administration of justice in the city in the absence of the consuls. The office of *prætor* was established in the year of the city 388, the consuls being at that time wholly engaged in foreign wars. The institution was intended also to compensate the nobility for the loss of their exclusive right to the consulship, to which honour the commons had now put in their claim, and succeeded. But this office also was thrown open to the plebeians, A.U. 418. Only one prætor was appointed until A.U. 519, from which time there were two—one, the *prætor urbanus*, for administering justice to the citizens of Rome; the other, the *prætor peregrinus*, for administering justice in places at a distance. When Sicily and Sardinia were formed into provinces, two more were created to govern them; and two more when hither and farther Spain were subjugated. Like the consuls, the prætors obtained their provinces by lot. Under the emperors, their privileges were greatly diminished. The prætor decreed and proclaimed public feasts; had the power to make and repeal laws, with the approbation of the senate and the people; and kept a register of all the freed men who were enfranchised at Rome. In the absence of the consuls, he had a right to lead the armies; he also commanded the *quæstors*, who served him as lieutenants, and were charged with part of the business of his office. He was entitled to the *prætexta*, the curule chair, and two lictors to walk before him in Rome, and six when out of the city.

PRÆTORIA'NI, PRÆTORIÆ COHORTES (from last), or *Prætorian Guards*, the emperor's guards, who in time were increased to ten thousand. The Prætorian bands owed their first institution to Scipio Africanus, who chose for his guards a company of the bravest men in his army; but in time they became very inimical to the liberties of their country. They were reorganized by Severus, and altogether disbanded by Diocletian. Their commander was called the *prætorian prefect;* and as the government gradually changed into a military despotism, he became the head of the army, the provinces, and even superior to the law.

PRÆTO'RIUM (same *deriv.*), among the Romans, the hall or court where the prætor administered justice. It was also the name of his palace.

PRAGMAT'IC SANC'TION, in the Civil Law, a rescript or answer of the sovereign, delivered by advice of his council to some college, order, or body of people who consult him in relation to the affairs of their community. A similar answer given to an individual is called simply a rescript.——The term *pragmatic sanction* was applied to the ordinance of Charles VII. of France, in 1438, which formed the foundation of the liberties of the Gallican church; also to the arrangement made by Charles VI., emperor of Germany, when, having no sons, in 1722 he settled his hereditary dominions on his eldest daughter, the Archduchess Maria Theresa.

PRA'IRIE (a meadow: *Fr.*), a word used to designate the remarkable natural meadows, or plains, which are principally found in the Mississippi valley, North America. They are classed as follows:—1. The *heathy* or *bushy*, which have springs, and are covered with small shrubs, bushes, grape vines, &c., very common in Indiana, Illinois, and Missouri. 2. The *dry* or *rolling*, generally destitute of water, and almost all vegetation but grass. These are the most common and extensive: the traveller may wander for days in these vast and nearly level plains, without wood or water, and see no object rising above the horizon. In this kind of prairies roam immense herds of bisons. 3. The *alluvial*, or wet prairies, form the third and smallest division; they are covered with a rich vegetation, and have a black, deep, and friable soil, of inexhaustible fertility; in a state of nature they are covered with tall rank grass, and in the rainy season are frequently overflowed, or contain numerous pools, the waters of which pass off solely by evaporation.

PRAM, or **PRAAM**, a flat-bottomed boat or lighter, used in Holland for conveying goods to or from a ship in loading or unloading. Also a kind of floating battery mounting several cannon, used in covering the disembarkation of troops.

PRATI'QUE (*Fr.*), in Commerce, a license or permission to hold intercourse and trade with the inhabitants of a place, after having performed quarantine, or upon a certificate that the ship has not come from an infected place.

PRE'AMBLE (*préambule: Fr.;* from *præambulo*, I walk before: *Lat.*), in Law, the introductory matter to a statute, which contains the reasons for making the enactment.

PREB'END (*prébende: Fr.*), the stipend or maintenance a prebendary receives out of the estate of a cathedral or collegiate church. There are several prebendaries attached to such churches, who reside and officiate in rotation. Prebends are *simple* or *dignitary:* a simple prebend has merely the revenue destined for its support; but a prebend with dignity has always a jurisdiction annexed to it.

PREB'ENDARY (from last), an ecclesiastic who enjoys a prebend. The difference between a prebendary and a canon is, that the latter obtains his prebend in consideration of his officiating in the church; but the former merely in consequence of his being admitted among the clergy of the cathedral, and without his enjoying, necessarily, any stipend from it.

PRECE'DENCE (*præcedo*, I go before: *Lat.*), by custom and courtesy, the right to taking place before another; which is determined by authority, and followed exactly on all public occasions of processions and the like.

PREC'EDENT (*præcedens*, going before *Lat.*), in Law, a judicial decision, which serves as a rule for future determinations in similar or analogous cases.——PRECEDENT also frequently denotes an original authentic instrument or writing, which serves as an exemplar from which to draw others.

PRECEN'TOR (*præcentor : Lat.*), the chanter or master of the choir in a cathedral.

PRE'CEPT (*præceptum : Lat.*), in Law, a command in writing sent by a justice of the peace, &c., for the purpose of bringing a person, record, or other matter before him. In a general sense, a *precept* signifies anything laid down as an authoritative rule of action; but it is applied particularly to commands respecting moral conduct.

PRECES'SION OF THE EQ'UINOXES (*præcedo*, I go before: *Lat.*), in Astronomy, a motion of the axis of the earth, by which the equinoctial points, or nodes, recede, with reference to the stars. The pole, the solstices, the equinoxes, and all the other points of the ecliptic, have a *retrograde motion*, and are constantly moving from east to west, or from Aries towards Pisces, &c.; by means of which the equinoctial points are carried further and further back among the preceding signs or stars, at the rate of about 50·1″ each year. This retrograde motion is called the *precession*, *recession*, or *retrocession* of the equinoxes It is caused by the combined action of the sun and moon on the mass of matter accumulated about the earth's equator, and forming the excess of the terrestrial spheroid above its prescribed sphere; and the motion which produces it may be compared to that of a top made to rotate rapidly with its axis inclined to the horizon. The axis, in such a case, slowly revolves about a vertical line, describing a cone Any section of the top perpendicular to its axis will, if produced to meet the horizon, at every instant intersect it in a new line, and the line of intersection will revolve with a motion corresponding to that of the axis of the top, but in a direction opposite to that of rotation. The precession of the equinoxes was discovered by Hipparchus, a century and a half before the Christian era; though it is alleged that the astronomers of India had discovered it long before. [See EQUINOXES.]

PRECIP'ITATE, anything thrown out of a combination of which it is a constituent, on the addition of a substance capable of producing a new combination with the other constituents. Thus if lime be added to a solution of sulphate of magnesia, magnesia is precipitated, being displaced by the lime which enters into combination with the acid. One metal may also be precipitated by another. At the Mint plates of copper are immersed in solutions of sulphate of silver, and metallic silver is thrown down, the acid combining with the copper to form a sulphate. At the mines of Freyburg metallic silver is obtained by agitating chloride of silver with scrap-iron. The iron enters into combination with the chlorine and turns out the silver. When sulphate of antimony is fused with scrap-iron the iron unites with the sulphur, and turns out the antimony. The metals aluminium and magnesium are obtained by fusing the chlorides with metallic sodium, when the latter combines with the chlorine and turns out the aluminium or magnesium.

PREDESTINA'TION (*prædestinatio*, a determining beforehand: *Lat.*), in Theology, a term used to denote the pre-ordination of men by the Supreme Being to everlasting happiness or misery. One who believes in this doctrine is called a *predestinarian*. [See CALVINISM]

PRE'DICABLE (*prædico*, I declare: *Lat.*), in Logic, a term which can be predicated of several others. There are said to be five predicables: genus, species, difference, property, and accident. Notions expressed by such terms are formed by the faculty termed *abstraction*

PREDIC'AMENT (same *deriv.*), in Logic, a *category*. Scholastic philosophers distribute all the objects of our thoughts and ideas into genera or classes, which the Greeks call *categories*, and the Latins *predicaments*

PRED'ICATE (same *deriv*), in Logic, that part of a proposition which affirms or denies something of the subject: thus, in 'snow is white, ink is not white,' whiteness is the *predicate* affirmed of snow and denied of ink.

PRE-EMP'TION (*præemptio: Lat*), the right of purchasing before others.

PREEN, to clean, arrange, and dress the feathers, as is done by birds, to enable them to glide more easily through the air or water. For this purpose they are furnished with two glands on the rump, which secrete an oily substance in a bag, from which they draw it with the bill, and spread it over the feathers.

PRE'FIX (*præfixus*, set up in front: *Lat*), or AFFIX, in Grammar, a particle put to the beginning of a word, either to vary its form or alter its signification.

PREHEN'SILE (*prehensus*, grasped: *Lat.*), adapted to seize or grasp. Thus, we say, the tails of some monkeys are *prehensile*.

PREHN'ITE, a mineral of a greenish colour, allied to the *Zeolites*, and originally discovered at the Cape of Good Hope by Prehn. It has been called shorl, emerald, chrysoprase, folspath, chrysolite, and zeolite. It is massive or crystallized, but the form of its crystals cannot be determined in consequence of their aggregation.

PREJ'UDICE (*Fr.*; from *præjudico*, I decide beforehand: *Lat.*), a judgment neither founded upon, no consistent with, reason; the error of ignorance, weakness, or idleness. It is the enemy of all truth, knowledge, and improvement, and is the blindness of the mind, rendering its powers not only useless but mischievous. Innumerable are the prejudices we imbibe in our youth; we are accustomed to believe without reflection, and to receive opinions from others without examining the grounds by which they are supported.

PREL'ATE (*prælatus*, carried in front: *Lat.*—distinguished), an ecclesiastic raised to some eminent dignity in the church, as a bishop or archbishop. The office or dignity of a prelate is called a *prelacy*.

PRELIM'INARY (*præ*, before; and *limen*, the threshold: *Lat.*—before the commencement), in general, denotes something to be examined and determined before an affair can be treated effectually. The *preliminaries of peace* consist chiefly in settling the powers of ambassadors, and points which may be in dispute must be determined previous to the treaty itself.

PREM'IER (the first: *Fr.*), the name usually given to the prime minister of England.

PREM'ISES (*præmissus*, sent in advance: *Lat.*), in Logic, the first two propositions of a syllogism, from which the inference or conclusion is drawn. Also, propositions antecedently proposed or proved.——PREMISES, in Law, lands, tenements, &c., before mentioned in a lease or deed.

PRE'MIUM (*præmium: Lat.*), properly, a reward or recompense; but it is chiefly used in a mercantile sense for the sum of money given to an insurer, whether of ships, houses, lives, &c. Also, the money paid by a purchaser in excess of the prime cost of an article, a share in a public company, &c. Also, the recompense or prize offered for a specific discovery, or for success in an enterprise.

PREMON'STRANTS, the order of regular canons or monks of Prémontré, in the isle of France; instituted in 1120.

PREMOR'SE(*præmorsus*, bitten off: *Lat.*), in Botany, an epithet which, when applied to *roots*, means such as are not tapering, but blunt at the end; and when applied to *leaves*, such as end very obtusely with unequal notches.

PREPEN'SE (*præpensus*, weighed beforehand: *Lat.*), in Law, an epithet applied to actions attended with premeditation and forethought; whence the term *malice prepense.*

PREPOSI'TION (*præpositio*, from *præpono*, I put before: *Lat.*), in Grammar, a part of speech which denotes the relations between the things signified by various words in a sentence.

PREROG'ATIVE (*prérogatif: Fr.*; from *prærogo*, I ask before: *Lat.*), an exclusive or peculiar privilege.——The *royal prerogative* is that special pre-eminence which a sovereign has, not only over all his subjects, but over the ordinary course of the common law, in virtue of the regal dignity. Among his prerogatives are the right of appointing ambassadors, and of making peace and war. It is the *prerogative* of the house of lords in Great Britain to decide legal questions in appeals against decisions of the courts of law. It is the *prerogative* of the house of commons to determine the validity of all elections of their own members.

PREROG'ATIVE COURT, an ecclesiastical court, which formerly existed for the trial of all testamentary causes, where the deceased had left *bona notabilia* (5*l.*) within two different dioceses. Its powers have been transferred to the court of probate.

PRESBYO'PIA (*presbus*, an old man; and *ôps*, an eye: *Gr.*), in Medicine, that defect of vision by which objects that are near are seen confusedly, but those at a distance more distinctly. It proceeds from various causes, but generally from too great flatness in the crystalline humour [see EYE]; and is common amongst aged persons.

PRES'BYTER (*presbuteros*, the comparative of *presbus*, old: *Gr.*—an *elder*), in the primitive Christian church, an *elder;* one who had authority in the church, and whose duty was to watch over the flock. The word is borrowed from the Greek translation of the Old Testament, where it usually signifies a ruler or governor. It was a title of office and dignity—not of age; and, in this sense, bishops are sometimes called presbyters in the New Testament.

PRESBYTE'RIANS (same *deriv.*), a sect of Protestants so called from their maintaining that ecclesiastical authority, in the New Testament, is vested in *presbyteries* that is, in ministers and ruling elders. The *kirk*, or church of Scotland, is governed by presbyteries, synods, and general assemblies, which constitution was introduced from Geneva, together with the doctrines of Calvin, the reformer of that country, by the celebrated John Knox. The *kirk-session* is the lowest court, and consists of the parochial minister and lay elders, generally to the number of twelve, the minister being moderator *ex officio.* The *presbytery* is composed of the ministers of several neighbouring parishes, with a lay elder from each. A moderator is chosen by it for half a year: he must be a clergyman. The *synod* is formed of the lay and clerical members of two or more presbyteries. The *general assembly* is the highest ecclesiastical court. Its decisions are final. It consists of representatives chosen by the various presbyteries, royal burghs, and universities. The total number of members is 386, of which 218 are ministers. The assembly chooses a moderator annually; he is a clergyman. A nobleman is present at its meetings as representative of the sovereign, under the title of *lord high commissioner;* but he merely opens, closes, or dissolves its sittings. There are 82 presbyteries and 16 synods in Scotland, about 150 presbyterian congregations in England, 450 in Ireland, and upwards of 100 in our North American colonies. The presbyterians stand opposed to the *episcopalians*, the latter preferring the hierarchy of bishops, and to *congregationalists* or *independents*, who hold every *pastor* to be as a bishop or overseer of his own congregation, *independent* of any person or body of men.

PRESCRIP'TION (*præscriptio*, from *præscribo*, I write before: *Lat.*), in Law, a right and title to a thing grounded upon a continued possession. Prescription is *negative*, when it relates to realty or corporeal hereditaments; *positive*, when to incorporeal hereditaments. It is *personal* when it is in a man and his ancestors; if it is in right of a particular estate, it is termed prescription in *que* estate. Prescription supposes a grant, and therefore can exist with regard to those things only which can pass by grant. Uninterrupted possession for thirty, and, in many cases, for twenty years, gives this title; and unless the title have arisen from some agreement, it becomes absolute in sixty years. Prescription differs from *custom*, which is a local usage.——

Prescription, in Medicine, the formula of a remedy for a disease, and the manner of using it, as given by a physician.

PRESENTA'TION (*præsentatio*, a placing before: *Lat.*), in Ecclesiastical Law, the act of a patron offering his clerk to the bishop, to be instituted in a benefice of his gift. An advowson is the right of presentation. A patron may revoke his presentation before institution, but not afterwards.

PRESENT'MENT (*præsento*, I place before: *Lat.*), in Law, an information made by the jury in a court, before a judge who has jurisdiction in the matter. Properly speaking, it is the notice taken by the grand jury, of their own knowledge, without any bill of indictment at the suit of the king, of any offence, nuisance, libel, &c.

PRES'ENTS (*præsentes* literas, the writing under observation: *Lat.*), in the *plural*, is used, in Law, for the thing then actually made or spoken of—a deed of conveyance, a lease, or other written instrument; as in the phrase, 'Know all men by these *presents*;' that is, by the writing itself (*per præsentes*).

PRES'ENT TENSE (*præsens*: *Lat.*), in Grammar, the tense or form of a verb which expresses an action or being in the present time, as 'I am reading;' or something that exists at all times, as 'temperance is to be preferred to excess;' or which expresses habits or general truths, as plants *grow*, birds *fly*, dogs *bark*, &c.

PRESER'VE (*préserver*, to preserve: *Fr.*), a small enclosed place where game is kept

PRES'IDENT (*præsideo*, I sit foremost: *Lat.*), an officer appointed to preside over a corporation, company, or assembly of men; to keep order, manage their concerns, or regulate their proceedings. Also an officer appointed or elected to govern a province or territory, or to administer the government of a nation. A *vice-president* is one who is second in authority to the president, and performs the duties of president when the latter is disabled or absent.

PRESS (*presso*, I press: *Lat.*), a machine by which things are compressed. It acts by means of the screw, the pressure of fluids [see **Hydrostatic Press**], &c.; and is of various kinds, as a wine-press, a cheese-press, a printing-press, &c.

PRESS'-GANG, a detachment of seamen, under the command of an officer, empowered to impress men into the naval service.

PRESS'MAN, in Printing, a workman who manages the press and impresses the sheets.

PRESS'URE (*pressura*, a pressing: *Lat.*), the force of one body acting on another by weight or by the continued application of power. Pressure is occasioned by weight or gravity, by the motion of bodies, by the expansion of fluids, by elasticity, &c. The degree of pressure is in proportion to the weight of the pressing body, to the power applied, or to the elastic force of resisting bodies.

PRESTA'TION MONEY (*præstatio*, a payment: *Lat.*), a sum of money paid yearly by archdeacons and other dignitaries to their bishop; also purveyance.

PREST-MONEY,* called *earnest-money*, the sum given to a soldier at the time he enlists; so called because it binds the receiver to be ready for service at all times appointed.

PRESUMP'TIVE EV'IDENCE (*præsumo*, I take for granted: *Lat.*), in Law, that which is derived from circumstances that necessarily or usually attend a fact, as distinct from direct evidence or positive proof.

PRETERIMPER'FECT (*præteritus*, past; and *imperfectus*, unfinished: *Lat.*), in Grammar, the tense which expresses action as being carried on at a past time: as *legebam*, I was reading. It is called also the *imperfect* tense.

PRE'TERITE (*præteritus*, past: *Lat.*), in Grammar, the tense which expresses an action perfectly past or finished, but without a specification of time: as *scripsi*, I have written. It is called also the *perfect* tense.

PRETERI'TION (*præteritio*, a passing over: *Lat.*), in Rhetoric, a figure by which, while pretending to pass over anything, we make a summary mention of it; as, 'I will not say the prince is noble, or that he is as learned as he is accomplished,' &c. The most artful praises are those bestowed by way of *preterition*.

PRETERNAT'URAL (*præter*, more than; and *naturalis*, natural: *Lat.*), an epithet for those events in the physical world which are deemed extraordinary, but not miraculous; in distinction from events which are *supernatural*, which cannot be produced by physical laws or powers, and must therefore be due to the direct intervention of a superior Being.

PRETERPER'FECT (*præter*, beyond; and *perfectus*, complete: *Lat.*), in Grammar, an epithet equivalent to *preterite*; applied to the tense of verbs which expresses action or being absolutely past; as, *scripsi*, I wrote.

PRETERPLU'PERFECT (*præter*, beyond; *plus*, more; and *perfectus*, complete: *Lat.*), an epithet in Grammar, designating the tense of verbs which expresses action or being past, prior to another past event or time; as, *scripseram*, I had written.

PREVARICA'TION (*prævaricatio*, from *prævaricor*, I walk crookedly: *Lat.*), a deviation from the plain path of truth and fair dealing; a shuffling or quibbling to evade the truth or the disclosure of truth.

PREVEN'TIVE SER'VICE, an appellation for the duty performed by the armed police officers engaged to watch the coasts, for the purpose of preventing smuggling and other illegal acts. The men thus employed are termed the *coast guard*.

PRICE-CUR'RENT, in Commerce, a published list or enumeration of the various articles of merchandise, with their prices, the duties (if any) payable on them when imported or exported, and the drawbacks occasionally allowed upon their exportation.

PRIEST (*priester*: *Ger.*; from *presbuteros*, an elder: *Gr.*), according to the modern acceptation of the word, a person who is set apart or consecrated to the ministry of the

Gospel. In its most general sense, the word includes all orders of the clergy duly licensed according to the forms and rules of each respective denomination of Christians; but Protestants are accustomed to apply the word more especially to clergymen of the Roman Catholic persuasion.——In primitive ages, the fathers of families, princes, and kings, were priests. In the days of Moses, the office of priest was restricted to the tribe of Levi. The priesthood consisted of three orders, the high-priest, the priests, and the Levites; and the office was made hereditary in the family of Aaron.——Among pagans, priests were persons whose appropriate business was to offer sacrifices and perform other sacred rites.

PRI'MACY (*primatus*, from *primus*, first: *Lat.*), the chief ecclesiastical station or dignity. The Archbishop of Canterbury is *primate* of all England. The Archbishop of York is primate of England; words without meaning, as the provinces of the two are quite distinct.

PRI'MÆ VI'Æ (the first passages: *Lat.*), the Medical term for the whole alimentary duct, including the œsophagus, stomach, and intestines, with their appendages.

PRI'MAGE, in Commerce, a small duty payable to the master and mariners of a ship.

PRIMA'TES (*primatus*, the chief place: *Lat.*), in Zoology, the highest order of Mammals. It is divisible into six families:—1. *Anthropini*, containing man alone; 2. *Catarhini* or *Simiidæ*, containing the apes of the old world; 3. *Platyrhini* or *Cebidæ*, containing all the apes of the old world, except the Marmosets; 4. *Arctopithecini*, containing the Marmosets; 5. *Lemurini*, containing the Lemurs; 6. *Galeopithecini*, containing the flying Lemur alone, a form which almost touches the bats, which some naturalists also place amongst the Primates. There is here an extraordinary series of gradations, leading from the kings of the animal world down to a point which must be placed low amongst the vertebrates.

PRIME MOV'ERS, the sources whence power is obtained; as steam, electro-magnetism, &c.

PRIME NUM'BERS, in Arithmetic, those which cannot be divided by any whole number greater than unity, or less than themselves; thus, 5, 7, &c. They are termed *prime* because they may be conceived to exist before those formed from them by multiplication, and which are said to be *composite*. Numbers are said to be prime to each other when they have no common measure except 1.

PRIME VER'TICAL, in Astronomy, the vertical circle of the sphere which intersects the meridian at right angles, and passes through the east and west points of the horizon.

PRI'MING, the spray with which wet steam is charged in the boilers and cylinders of steam engines.——PRIMING, among Painters, the first colour laid on canvas, or on a building, &c.

PRIM'ITIVE (*primitivus*, the earliest: *Lat.*), in Grammar, a root or original word in a language, in contradistinction from *derivative*; thus, *God* is a primitive, *godly* a derivative.

PRIMOGEN'ITURE (*primogenitus*, first-born: *Lat.*), in Law, the right of the first-born, which with us is restricted to the inheritance of descendable honours, and of the whole of the real estate, in the absence of a testamentary disposition. The justice of the latter arrangement has been often contested. By the ancient custom of gavelkind, still preserved in Kent, primogeniture is disregarded, the paternal estate being equally divided among the sons. [See FEUDAL SYSTEM.]

PRIM'ROSE, a well-known plant, the *Primula veris* of botanists.

PRINCE (*Fr.*; from *princeps*: *Lat.*), a general title for sovereigns. Also, a title of honour, which with us is limited to the blood royal.

PRIN'CIPAL (*principalis*, original: *Lat.*), in Commerce, the sum due or lent, so called in opposition to *interest*.——In Law, the absolute perpetrator of a crime is called a *principal* in the first degree; a *principal* in the second degree is one who is present aiding and abetting; distinguished from *accessory*.

PRINCIP'IA, NEWTON'S, a work by Sir Isaac Newton, published in 1687, the full title of which is *Philosophiæ Naturalis Principia Mathematica*, that is, the mathematical principles of Natural Philosophy. The manuscript was presented to the Royal Society, in whose keeping it remains. It was ordered by that body to be printed, but the expense was borne by Halley the astronomer. This work, the greatest in the history of science, is divided into three books. The first deals with the laws of unresisted motion and attraction. The second treats of the laws of resisted motion, hydrostatics, and the motions of fluids. In the third book Newton showed the application of the results arrived at in the two preceding books to the system of the world. He here treats of gravitation, the motions of the planets and their satellites round their respective centres of gravity, the nature of their orbits, the lunar phenomena, the tides, the motions of comets, &c.

PRIN'CIPLE (*principium*: *Lat.*), in a general sense, the origin, source, or primordial substance of anything.——In Ethics, that which is believed, and serves as a rule of action or the basis of a system; as, the *principles* of morality, the *principles* of the Stoics, &c.——In Science, a truth admitted either without proof, or considered as having been before proved.

PRINT'ING (*empreinte*, an impression: *Fr.*), the art of taking impressions from wooden blocks, types, or plates, upon paper, silk, calico, or any other substance. It is that very important art, by means of which copies of books are multiplied, and consequently knowledge and science diffused among mankind. It is understood to have been practised at least fifty years before the Christian era, in China; but Chinese printing differs essentially from European, and the merit of rendering the art truly valuable to the human race belongs to him who first introduced *moveable* types. In their earliest essays Guttenburg, Faust, and Mentz all used wooden blocks, on which the letters were cut in the Chinese manner: and from the specimens that remain, it appears that they impressed only one side of the paper, and then pasted the blank faces of every two leaves together, to form but one, with print on either side. About the year 1450, they used single letters of wood; and at length, letters of metal. This last great invention is generally attributed to Schoeffer, first the servant, and afterwards the partner and son-in-law, of Faust. At the invention of the art, the character employed was the old Gothic or German, and the earliest printing was such a complete facsimile of the manuscripts which it copied, that, at the present day, it often requires the aid of chemistry to determine whether a given volume is a manuscript or a production of the press; particularly as the ornamental letters and the borders were filled in by hand, after the book was printed. The Roman type was first introduced by Sweynheim and Pannartz, at Rome; and the *Italic* by Aldus. The earliest complete Greek work was a grammar of that language, printed at Milan in 1476. The Pentateuch, which appeared in 1482, was the first work printed in the Hebrew character: and the earliest known Polyglott Bible—Hebrew, Arabic, Chaldaic, Greek, Latin—issued from the press of Genoa in 1516. The art of printing was first introduced into England by William Caxton, a native of Kent, who established a press in Westminster Abbey, some time between 1471 and 1474. Before the middle of the 16th century, printing had reached a flourishing condition in this country; for it is recorded that, in the reigns of Henry VIII. and his successors, English printers had become 'so skilful as to print books as well as any beyond the seas.' The art is not known to have existed in Scotland earlier than the year 1500; and we find that about fifty years subsequent to that time, it was introduced into Ireland. But it was not long before Scotland distinguished itself by the extent and beauty of its typographical productions; while Ireland can hardly be said to have advanced a step in the art of printing *books* till the beginning of the 18th century. The workmen by whom the art of printing is performed are of two kinds:—1. *Compositors*, who range and dispose the letters into words, lines, pages, and sheets; and, 2. *Pressmen*, who apply the ink and take off the impressions. Until a comparatively recent period, the printing press was formed chiefly of wood; and for the first essential modification of it the world is indebted to Earl Stanhope. The *Stanhope press* is composed entirely of iron; the table on which the types rest, and the platten (or surface which produces the impression) are made perfectly level; a beautiful combination of levers is added to give motion to the screw, causing the platten to descend with increasing force, till it reaches the type, when a very great power is obtained. Various other iron presses, more or less upon the principle of the 'Stanhope,' with such improvements as time and further experience suggested, were subsequently made; among which the ingenious inventions of Clymer, Ruthven, Cogger, and Cope deserve to be mentioned. They were all, however, constructed on the principle of a reciprocating, not a continuous motion: and it is a remarkable fact that from the invention of printing to the year 1798, a period of nearly 300 years, no important improvement was introduced into this art. A new era had, however, arrived, when the demands for prompt circulation of political intelligence required powers of printing newspapers beyond the reach of the most expeditious hand presswork; and at length the automatic printing machine struggled into existence. A mere outline of the improvements which have taken place since the commencement of the present century would occupy many pages. The great triumph in the art has, however, been the introduction of cylindrical machinery. The *suggestion* of this important change belongs to Mr. W. Nicholson, the able editor of the 'Philosophical Journal;' but the first *working* machines were erected by König, a Saxon, who was engaged for several years in this country in bringing his contrivances to perfection; and, at length, the reader of the *Times* was told, on Nov. 28th, 1814, that he held in his hand a newspaper printed by machinery, and by the power of steam. In these machines the type was made to pass under the cylinder, on which was wrapped the sheet of paper, the latter being held firmly in its place by means of tapes; the ink was placed in a cylindrical box, from which it was forced by means of a powerful screw depressing a tightly-fitted piston; thence it fell between two iron rollers; below these were placed a number of other rollers, two of which had, in addition to their rotary motion, an end motion—that is, a motion in the direction of their length—for the purpose of distributing the ink more uniformly; and the whole system of rollers terminated in two, which applied the ink to the types. This machine produced 1100 impressions per hour, and subsequent improvements raised the number to 1800. The next machine, also by König, was one that printed *both* sides of the sheet, by conveying it from one cylinder to another. This was made in 1815, and printed 1000 sheets on both sides per hour. In the same year Cowper obtained a patent for curving stereotype plates, for the purpose of fixing them on a cylinder. These machines, though only adapted for stereotype printing, first showed the best method of furnishing, distributing, and applying the ink by rollers. Applegarth and Cowper, by their conjoint ingenuity, superseded König's inventions; and constructed a number of machines, modified in twenty-five different ways, for printing books, bank-notes, newspapers, &c.; their greatest success has been in printing newspapers. In the *Times* machine constructed by them, the form passes under four printing cylinders, which are fed with sheets of paper by four boys, and after the sheets are printed they pass into the hands of four others; by this contrivance from 4600 to 5000 sheets per hour are printed on one side. But the machine used at present in that establishment for ordinary purposes is still more powerful. It consists of eight *vertical* cylinders, each carrying and printing its sheet of paper; and all of them printed on one side, by a single revolution of a central drum, which carries the type. One of these machines prints 11,000 and another 12,000 per hour; and 70,000 copies of the newspaper have been issued in one day. We shall conclude with a short description of Mitchel's composing and distributing machines, which are used in the printing works of Messrs. Spottiswoode & Co., and have been found highly effective: they complete the subservience of mechanism to printing, in all its details. Attempts have been made for some years past, in various parts of Europe, with different degrees of success, to construct such machines. It is clear that no composing machine can ever supersede the necessity of intelligence in connection with mechanism; for the combinations of the type in printing being practically infinite [see PERMUTATIONS and COMBINATIONS], they can never be provided for even in the most perfect. The composing machine very much resembles a grand pianoforte; the workman occupies the position of the player; each of the keys is marked with the letter with which it is in connection, and of which a sufficient number is contained in one of a set of nearly vertical grooves which have been filled with the respective letters by the distributing machine. When the workman touches a key, the required letter drops from its slide, and, falling on one of a system of travelling tapes which correspond in position to the strings of a piano, is carried to another travelling tape which runs along the sloping side of the machine, and which brings it to the end of the longest side, whence it is tilted into a long brass slide. The latter, when full, is removed for the purpose of adjusting the lines to the lengths required by the width of the intended page of the book. The *parallel* tapes just mentioned carry the types away from the workman, and when they arrive at the *oblique* tape, this carries them in a direction from his right towards his left hand. All the types, therefore, except that released by the key at his extreme left, are carried successively in two directions, that they may ultimately reach the same point, and be tilted from it. They must come to that point exactly in the order in which the workman touches the keys, so that in fact, were all the keys touched at once, all the letters thus liberated from the slides would arrive together at the tilting-point, however different the distances to be travelled over by them respectively. Effecting this constitutes the real ingenuity of the contrivance. It is done, first by diminishing the lengths of the parallel tapes, as the distance to be travelled over on the oblique tape increases. But as no modification of this kind can exactly equalize the sums of the distances to be travelled by the types liberated by the different keys, the excess, which gradually increases from left to right of the workman, is compensated by an increased velocity imparted to the motion of the oblique tape: so that types from all parts of the machine take exactly the same time to reach the tilting-point, and there will be exactly the same interval between the arrival of the different types successively liberated by the keys as between the points of time at which they are touched by the workman. The latter requires a little practice to become used to the machine, but it soon enables him greatly to exceed the hand-compositor in the amount of work which he does, so as soon to do without difficulty twice as much. Another advantage is, that one workman can 'justify'—that is, arrange the composed type in lines—while another works the keys. There are but forty keys, including all the types, &c., except those which are rarely used, and which, being in a case near the workman, can, when it is required, be easily conveyed by him to one of the parallel tapes. The distributing machine may be worked by a child. It consists of a round table, with slides radiating from the centre; the letters are carried round on the revolving frustum of a cone, being poised on notches which are placed variously in the different letters, and which allow them to assume such positions as will cause them, when during revolution they come into contact with the proper one of a series of offsets on an inclined plane beneath, to be tilted off into the radiating grooves which are intended to receive them respectively. Only one of the letters can be tilted off by any one of the offsets, which are passed by those letters with which they do not correspond; and thus all the letters are distributed successively into their proper grooves, whence they are removed with great facility to the respective vertical grooves of the composing machine. This machine distributes about 8000 types per hour: a workman in the ordinary way can distribute only about 5000 types per hour. The subordinate details of these machines are highly ingenious and effective, but would not be understood without illustrations; the general principles on which they act will, however, be sufficiently evident from what has been said.

PRI'OR (*Lat.*), the superior of a convent of monks; or the next in dignity to an abbot when there is one.

PRI'SAGE (*prise*, a taking: *Fr.*), an ancient right belonging to the crown of England, of taking two tuns of wine from every ship importing twenty tuns or more. This, by charter of Edward I., was changed into a duty of two shillings for every tun imported by foreign merchants; and called *butlerage*, because paid to the king's butler.

PRISCIL'LIANISTS, in Church History, a Christian sect, so called from their leader, Priscillian, a Spaniard by birth, and bishop of Avila. He was put to death A.D. 382, for heresy, on the accusation of a brother bishop, whose character is stated to have been disreputable, and with whom, there is reason to believe, it was enough to lead a life of purity and austerity to fall under the accusation of Priscillianism, which was considered to be identical with *Manichæism*. But the accusation of Manichæism was not unfrequently made at a later period, against those who merely denounced abuses and demanded a reformation of morals. His peculiar tenet was stated by his enemies to have been, that it is lawful to make false oaths in the support of one's cause and interest.

PRISM (*prisma*, from *prizo*, I saw: *Gr.*), in Geometry, a solid whose upper and lower bases are equal and similar figures, and whose lateral surfaces are plane parallelograms. If the bases are triangular, it is called a *triangular prism;* if square, a *quadrangular*, &c.——PRISM, in Dioptrics, a triangular glass body used in experiments regarding the nature of light and colours. The phenomena and uses of the prism arise from its separating the rays of light in their passage through its substance; and the doctrine it demonstrates is, that colours are original properties, inherent in light itself. The sun's rays transmitted through a prism to an opposite wall project an image tinted like a rainbow. Its colours are red, yellow, green, blue, and violet; and the whole phenomenon is explained upon the principle that the coloured rays, which were before mixed and blended together, are now, in virtue of their different refrangibilities, separated by refraction, in passing through the prism, so that each colour is placed by itself.

PRIVATEE'R (*privatus*, pertaining to an individual: *Lat.*), a ship of war owned and equipped by private persons at their own expense, but authorized by the government to seize or plunder the vessels of an enemy. The owners of privateers must bind themselves not to violate the stipulations of treaties made by their government, and not to misuse their prisoners. A ship fitted out and acting as a privateer without being licensed or commissioned by government, is a *pirate*. It is manifestly proper that the severest restrictions on privateering should be enforced. The wish to amass plunder is the only principle by which men in such circumstances are actuated; and hence it would be idle to suppose that they will be very scrupulous about abstaining from excesses.

PRIV'ATIVE (*privativus*, denoting privation: *Lat.*), in Grammar, a prefix to a word which changes its signification, and gives it a contrary sense. Thus *un* and *in*, as *unwise*, *inhuman*.

PRIV'ET, in Botany, a well-known shrub of the genus *Ligustrum*, nat. ord. *Oleaceæ*. The *evergreen privet* is of the genus *Rhamnus*, nat. ord. *Rhamnaceæ*.

PRIV'ILEGE (*privilegium:* from *privus*, separate; and *lex*, a law: *Lat.*), in Law, some peculiar benefit granted to certain persons or places, contrary to the usual course of the law, or beyond the advantages enjoyed by other citizens. Thus the nobles of Great Britain have the *privilege* of being tried by their peers only; and members of parliament have the *privilege* of exemption from arrest in certain cases.

PRIV'Y-COUN'CIL (*privé*, private: *Fr.*), in British Polity an executive body, with whose assistance the crown issues proclamations, which, if not contrary to law, are binding on the subject. It is summoned on a warning of forty-four hours, and is never held without the presence of a secretary of state. The members of the privy-council are styled *right honourable*. Anciently, the *privy-council* was a high court of justice; but it does not in modern times interfere with judicial matters, confining itself to the executive branch of government. It has, however, an appellate jurisdiction from all parts of the British dominions, except Great Britain and Ireland; and appeals from certain courts are intrusted to a judicial committee of the privy-council.

PRIV'Y-SEAL (same *deriv.*), a seal affixed, by the lord-keeper of the privy seal, to instruments which afterwards pass the great seal.——The word *privy-seal* is also used elliptically for the person intrusted with the privy-seal: he is the fifth great officer of state in England, and a member of the cabinet.

PRO AND CON, i.e. *pro* and *contra* (*Lat.*), for and against; a phrase frequently occurring in common parlance.

PRO CONFES'SO (as a thing admitted: *Lat.*), in Law, a term applied to a defendant in chancery who appears and is afterwards in contempt for not answering; in which case the matter contained in the bill is taken *pro confesso*, that is, as though it had been confessed.

PRO'A, a vessel used in the South Seas, with the head and stern exactly alike, but with the sides differently formed; that intended for the lee side being flat, the other rounded. To prevent oversetting, the proa is furnished with what is called an outrigger, from the windward side.

PROBABIL'ITY (*probabilitas*, from *probabilis*, capable of proof: *Lat.*), that state of a question which falls short of moral certainty, but inclines the mind to receive it as the truth. Demonstration produces certain knowledge, and *probability* opinion. If the chance that a thing may happen is less than the chance that it may not happen, it is said to be probable; and the methods of obtaining the numbers which express these variable chances constitute what is termed the *science of probabilities.*——In mathematical language, probability has a definite signification. Suppose that seven balls, four black and three white, are placed in an urn: the probability of drawing any particular ball is $\frac{1}{7}$, and the probability of drawing a black is four times as great, that is, $\frac{4}{7}$. The probability will remain the same as long as the ratio between the colours is unchanged; for, if there are seventy balls, forty black and thirty white, the chance of drawing a black will be $\frac{40}{70}$ which is the same as $\frac{4}{7}$. If the probability relates to *simultaneous events*, it is also easily calculated: thus the chance of throwing two aces with two dice. The chance of throwing an ace with one of them by itself is $\frac{1}{6}$, and with the other by itself, $\frac{1}{6}$; therefore, with both together, it is $\frac{1}{6}$ of $\frac{1}{6}$, that is, $\frac{1}{36}$. The same reasoning would hold with three or more events. If the probability relates to *successive events*, the calculation is similar: thus, the probability of throwing an ace twice successively. The probability of throwing it the first time is $\frac{1}{6}$, and the second time also $\frac{1}{6}$; but, at both times, it is $\frac{1}{6}$ of $\frac{1}{6}$, that is, $\frac{1}{36}$. Of course, the probability of throwing it neither time is $\frac{5}{6}$ of $\frac{5}{6}$, that is, $\frac{25}{36}$.——PROBABILITY, as applied to human life, is founded on tables of mortality, and serves as the foundation of societies which, for certain annual premiums, varied according to age, &c., undertake to pay certain sums to the executors of the party whose life is insured.

PRO'BATE (*probo*, I prove: *Lat.*), in Law, the official proof of the genuineness and validity of a will; or the exhibition of the will to the proper officer, and such other proceedings as the law prescribes as preliminary to its being carried into effect by the executor. *Probate* of a will is now obtained in the court of probate; the will which has been proved is deposited in that court, and a copy on parchment is made out under its seal and delivered to the executors.

PROB'LEM (*problēma*, from *proballo*, I put forward: *Gr.*), in Algebra, a question or proposition which requires something unknown to be investigated, and the truth of the result demonstrated.——In Geometry, a proposition in which some operation or construction is required; as to bisect a line or an angle, &c.——In Logic, a proposition that appears neither absolutely true nor false, and consequently may be asserted either in the affirmative or negative.——In a general sense, a *problem* may be defined, any question involving doubt or uncertainty, and requiring some operation or further evidence for its solution.

PROBOS'CIS, the trunk or snout of an elephant, being a prolongation of the nose.——The oral instrument of the *Diptera*.——The oral apparatus of certain gasteropods, which is so long as to be capable of being protruded to some distance from the body. The mouth is at the end.

PROCATARX'IS (*prokatarxis*, from *prokatarcho*, I begin first: *Gr.*), in Medicine, the predisposing cause of a disease; the *procatarctic* cause.

PRO'CEEDS (*procedo*, I am derived from: *Lat.*), in Commerce, the money raised by the sale of goods.

PROCELLA'RIA (*procella*, a violent storm: *Lat.*), in Ornithology, a genus of oceanic birds. [See PETREL.]

PROC'ESS (*procès*: *Fr.*; from *processus*, a going forwards: *Lat.*), in Law, the whole course of proceedings in any cause, civil or criminal, from the original writ to the end of the suit. In a more limited sense, *process* denotes that by which a man is first called into any temporal court. *Original process* is the means taken to compel the defendant to appear in court. *Mesne process* is, strictly speaking, that which issues, at the commencement of a suit or during its progress, upon some collateral or interlocutory matter. It is usually applied only to writs under which parties are arrested. *Final process* is the process of execution.——PROCESS, in Anatomy, any protuberance, eminence, or projecting part of a bone.——PROCESS, in Chemistry, the whole course of an experiment or series of operations, tending to produce something new.

PRO'CHRONISM (*pro*, before; and *chronos*, the time: *Gr.*), an error in chronology, when events are dated anterior to the time at which they happened.

PROCLAMA'TION (*proclamatio*: *Lat.*), a public notice or declaration of anything in the name of the prince or supreme magistrate. To issue a proclamation is a prerogative of the sovereign; and it is binding on the subject, so far as it is grounded on, and enforces, the laws of the land. It is of two kinds: one enforcing an actually existing law, the other exercising an extraordinary but dormant power in the king. It is held that the sovereign may, by a proclamation, suspend or dispense with existing laws, in particular circumstances.——PROCLAMATION, a solemn declaration of war and peace; and the act of notifying the accession of a prince to the throne. Also, the public declaration used at the calling of a court, and for various other objects.

PROCON'SUL (*Lat.*: from *pro*, instead of; and *consul*, a consul), a Roman magistrate sent at the close of his consulship (though sometimes without his having been consul) to govern a province, with consular authority. The proconsuls were appointed from the body of the senate, and their authority expired at the end of a year; but it might be prolonged, as was done in the case of Cæsar. In the time of the republic, the proconsul held both the military command and the civil jurisdiction of his province. Before the proconsul quitted Rome, he went up to the Capitol, offered sacrifice, put on the robe of war called *paludamentum*, and then departed from the city in pomp, preceded by lictors with rods and axes, and attended by his friends to some distance from Rome. His equipage, consisting of pavilions, horses, mules, clerks, secretaries, &c., was called his *viaticum*, and was provided at the public expense.

PROC'TOR (contracted from *procurator*, a manager: *Lat.*), a person employed to manage another's cause in a court of civil or ecclesiastical law; as in the court of admiralty, or in a spiritual court. His duty is similar to that of a solicitor or attorney in other courts.——Also an officer in the universities of Oxford and Cambridge.

PROCUM'BENT (*procumbens*, bending down: *Lat.*), in Botany, trailing; an epithet applied to a stem which is unable to support itself, and therefore lies on the ground, but without putting forth roots.

PROCURA'TION (*procuratio*, literally the averting by a sacrifice: *Lat.*), in Law, a composition paid by an incumbent to the bishop or archdeacon, to commute for the entertainment which was to have been given him at his visitation.——Also, the instrument by which a person is empowered to transact the affairs of another.

PROCURATO'RES (managers: *Lat.*), under the Roman emperors, officers sent into the provinces to regulate the public revenue, receive it, and dispose of it as the emperor directed. Such an officer was Pontius Pilate in Judæa; but, since the Jews were looked upon as a rebellious people, besides his authority over the revenue, he was invested with all the power of a proconsul, even that of life and death.——**PROCURATORES**, in the Roman courts of judicature, were properly such lawyers as assisted the plaintiff in proving, or the defendant in clearing himself from, the matter of fact alleged. They are often confounded with the *advocates*, but were equivalent to our *attorneys*.

PRO'CYON, a star of the first magnitude in the constellation of the Lesser Dog; it is the α *Canis Minoris* of astronomers.

PROD'UCE (*produco*, I make: *Lat.*), in an enlarged sense, is what any country yields from labour and national growth; which may serve either for the use of the inhabitants, or be exported to foreign countries. In a more limited sense, we speak of the *produce* of a farm, of a mine, of a tax, &c; but, when we allude to a work either of nature or art, we use the word *production*.

PRO'DUCT (*productus*, formed by prolongation: *Lat.*), in Arithmetic and Algebra, the number or quantity produced by multiplying two or more quantities together, as $5\times4=20$, $a\times b=ab$: 20 and ab are the products required.

PRODUC'TIVE LA'BOUR, that which increases the number or amount of consumable products; opposed to *unproductive labour*. The labour of the farmer and mechanic is productive; the labour of officers and professional men is unproductive to the state

PROEMPTO'SIS (*pro*, before; and *empipto*, I fall in: *Gr.*), in Astronomy, the addition of a day every 330 years, and another every 2400, to prevent the new moon happening too soon. The opposite is *metemptosis*, which see.

PROFES'SION (*professio*: *Lat.*), a word which, when applied to a person's vocation or employment, designates an occupation not merely mechanical. We say, the learned *professions*; the *profession* of a clergyman, a lawyer, a physician, a surgeon, a lecturer, or a teacher. In like manner, we use the word *professional* when speaking of literary and scientific studies, pursuits, or duties.

PROFES'SOR (*Lat.*), one who publicly teaches any science or branch of learning in a university or college, as a professor of natural history, of mathematics, of theology, &c. In a university, some professors are denominated from the arts they profess, others from the founders of the professorships, or those who assigned a revenue for the support of the professors.

PRO'FILE (*profil*: *Fr.*), in general, the view of an object from one of its sides.——**PROFILE**, in Architecture, the outline of a figure, building, or member; also the draft of a building, representing it as if cut down perpendicularly from the roof to the foundation.——**PROFILE**, in Sculpture and Painting, a head, portrait, &c., represented sideways, or in a side view. On almost all medals, faces are represented in profile.

PROF'IT AND LOSS, in Commerce, the gain or loss arising from goods bought and sold; the former of which, in book-keeping, is placed on the creditor's side, the latter on the debtor's. *Net profit* is the gain made by selling goods at a price beyond what they cost the seller, and beyond all costs and charges.

PROFLU'VIA, in Medicine, morbid excretions of mucus from the nostrils, and parts connected with them.——Also, dysentery, with a morbid excretion of mucus from the bowels.

PROG'NATHOUS (*pro*, before; *gnathos*, a jaw: *Gr*), a term applied to skulls, such as those of negroes, which have the profile of the face inclined by reason of the front part of the jaws projecting much beyond the forehead; opposed to *orthognathous*. 'Draw a line on a globe,' says Prof. Huxley, 'from the Gold Coast in Western Africa to the steppes of Tartary. At the southern and western end of that line there live the most dolicocephalic, prognathous, curly-haired, dark-skinned of men, the true negroes. At the northern and eastern end of the same line there live the most brachycephalic, orthognathous, straight-haired, yellow-skinned of men, the Tartars and Calmucks. The two ends of this line are ethnological antipodes.'

PROGNO'SIS (*prognōsis*, a perceiving beforehand: *Gr.*), in Medicine, the method of foretelling the event of a disease by particular symptoms. Hence the word *prognostic*, a sign or symptom indicating the way in which a disease will progress or terminate

PRO'GRAMME (*programma*: *Gr.*), a detailed account or advertisement of some public performance. In a university, a billet or notice to invite persons to an oration.——In Classical Antiquity, an edict posted in some public place.

PROGRES'SION (*progressio*, a going forwards: *Lat.*), in Arithmetic, a series of numbers increasing or decreasing by a certain law In an *arithmetical* progression, they increase or decrease by a *common difference*; thus, 3, 5, 7, 9, &c., where the common difference is 2. In a *geometrical* progression they increase by a *common ratio* or multiplier, or decrease by a common divisor: thus, 3, 9, 27, 81, &c., where the common ratio is 3. In any three consecutive terms of an *harmonical* progression, the first is to the third as the difference between the first and second is to the difference between the second and third.

PROJEC'TILE FORCE (*projectus*, thrown to a distance: *Lat.*), the force with which a cannon-ball or missile is thrown: being modified by the action of gravity, it occasions the body to describe a curve line. The velocity of a musket-ball is, on an average, 1600 feet per second, and its range half a mile. In velocities exceeding 1600 feet per second, the resistance of the air is greatly increased; hence the absurdity of giving balls too great an initial velocity. To give a bullet the velocity of 2000 feet per second, requires half as much more powder as to give it the velocity of 1600 feet; yet, after both have moved 400 feet, the difference between the velocity of each is reduced to 8 feet per second. A 24-pound ball moving at the rate of 2000 feet per second, meets with a resistance of 800 pounds.

PROJEC'TILES (same *deriv.*), in Mechanics, that branch which treats of the motion of bodies thrown or driven from the surface of the earth by an impelling force, and affected by gravity and the resistance of the air. Not taking the latter into account, the path of a projectile can be shown to be a parabola; but, when a body moves with considerable velocity, the resistance of the air becomes very serious. Some anomalous circumstances occur in experiments with artillery; thus, balls are frequently driven to the right or left, as if acted on by a lateral force; and sometimes, without any apparent cause, the range is much shorter than at others, &c.

PROJEC'TION (*projectio: Lat.*), in Architecture, the prominency of columns, &c., beyond the level of the wall.——PROJECTION OF THE SPHERE, a representation of the circles on the surface of the sphere, upon a plane surface. There are three principal kinds of projection: the *stereographic*, the *orthographic*, and the *gnomonic*; and to these may be added the *globular*, on which is founded the construction of the *globular chart*. [See these terms.]

PROLEGOM'ENA (things to be said previously: *Gr.*), introductory or preliminary remarks or dissertations, prefixed to a book or treatise.

PROLEP'SIS (*prolēpsis*, from *prolambano*, I take beforehand: *Gr.*), a figure in Rhetoric, by which the speaker anticipates or prevents objections, by alluding to or answering them himself.

PROLEP'TIC (*prolēptikos*, anticipating: *Gr.*), in Medicine, an epithet applied to a periodical disease, whose paroxysm returns at an earlier hour every time, as is frequently the case in agues.

PROLIF'EROUS (*proles*, offspring; and *fero*, I bear: *Lat.*), in Botany, prolific. A *proliferous stem* is one which puts forth branches only from the centre of the top, or which shoots out new branches from the summits of the former ones, as the pine and fir. A *proliferous umbel* is a compound one which has the smaller umbels divided.

PROLIFICA'TION (*proles*, offspring; and *facio*, I make: *Lat.*), in Botany, the production of a second flower from the substance of the first, either from the centre of a simple flower, or from the side of an aggregate one.

PRO'LOGUE (*prologos*, from *prolego*, I say beforehand: *Gr.*), in Dramatic Poetry, an address to the audience previous to the commencement of the play, delivered by one of the performers. It may be in either prose or verse, but is generally in the latter; and it usually consists of apologetic remarks on the merits of the piece about to be represented. Sometimes it relates to the situation in which the author or the actors stand to the public.

PROLU'SION (*prolusio*, from *proludo*, I play beforehand: *Lat.*), in Literature, a term formerly applied to certain pieces or compositions made previously to others, by way of prelude or exercise.

PROM'ISSORY NOTE (*promissum*, a promise: *Lat.*), a writing or note of hand, promising the payment of a certain sum at a certain time, in consideration of value received by the promiser.

PROM'ONTORY (*promontorium:* from *pro*, in front of; and *mons*, a mountain: *Lat.*), in Geography, a high point of land or rock, projecting into the sea; the extremity of which is called a *headland*.

PRONA'TION (*pronus*, inclined downwards: *Lat.*), in Anatomy, that motion of the radius by which the palm of the hand is turned downwards; opposed to *supination*.

PRO'NOUN (*pro-nomen*, instead of a noun: *Lat.*), in Grammar, a declinable part of speech which, being used instead of a noun, prevents the repetition of it. Pronouns are *personal* when they simply denote the person, as *I*, *thou*, *he*, &c.; *possessive*, when they also denote possession, as *my*, *thine*, *his*, &c.; *relative*, when they express a relation to something going before, as *who*, *which*; *interrogative*, when they serve to ask a question; *demonstrative*, when they point out things precisely, as *this*, *that*. They are also, and more accurately, divided into *substantive*, or personal; and *adjective*, which include all the others.

PROOF (*prouver*, to prove: *Fr.*; from *probo*: *Lat.*), in Logic, that evidence which convinces the mind of the certainty of a proposition, and produces belief. *Proof* differs from *demonstration*, being derived from personal knowledge or conclusive reasoning; whereas the term demonstration is applicable only to those truths of which the contrary is inconceivable.——In Printing and Engraving, a *proof* is a rough impression taken for correction.

PROOF SPIRIT, a mixture of equal weights of absolute alcohol and water. The spec. gravity of such a mixture is 0·917, but the density of commercial proof spirit is 0·930.

PROPAGANDA (*propago*, I propagate: *Lat.*), a term applied during the French revolution to secret societies, whose object was the propagation of democratical principles; and it has since come to signify any kind of institution for making proselytes for political objects. The name was originally given to those institutions which were erected by the papal court for the extension of its own power and the Roman Catholic religion among those who were not within its pale. It was called the *Congregatio de Propaganda Fide* (Society for Propagating the Faith), and was founded by Gregory XV. in 1622.

PROP'ER (*propre*: *Fr.*; from *proprius*, peculiar: *Lat.*), in Heraldry, an epithet for any charge which is to be represented in coat-armour in its own tincture or natural colours.

PROP'ERTY (*proprietas: Lat.*), a particular virtue or quality which nature has bestowed on some things exclusive of all others. Thus, colour is a *property* of light; extension, figure, divisibility, and impenetrability are properties of bodies, &c.——LITERARY PROPERTY can be secured only for a limited time; and many consider it unreasonable that the productions of manual labour should rank higher in the scale of rights than the nobler productions of the intellect.

PROPH'ET (*prophētēs*, from *prophēmi*, I say beforehand: *Gr.*), in general, one who foretells events. Among the canonical books of the Old Testament are the writings of sixteen prophets, four of whom are denominated the 'greater prophets,' viz. Isaiah, Jeremiah, Ezekiel, and Daniel, who were so called from the length or extent of their writings, which exceed those of the others. The 'lesser prophets' are Hosea, Joel, Amos, Obadiah, Jonah, Micah, Nahum, Habakkuk, Zephaniah, Haggai, Zechariah, and Malachi. Jonah, the earliest of the prophets, lived about 800 years B.C.; and Malachi, the latest, about 400 B C.

PROPHYLAC'TIC (*prophulaktikos*, precautionary: *Gr.*), in Medicine, an epithet for whatever preserves or defends against disease.

PROPITIA'TION (*propitiatio*, from *propitio*, I appease: *Lat.*), in Theology, an atonement or sacrifice offered to God to assuage his wrath, and render him propitious. Among the Jews there were both ordinary and public sacrifices, offered by way of thanksgiving; and extraordinary ones, offered by particular persons guilty of any crime, by way of *propitiation.*——PROPITIATION, a feast among the Jews, celebrated on the 10th of the month Tisri, in commemoration of the divine pardon proclaimed to their forefathers through Moses, who, as God's agent, remitted the punishment due to the crime of their worshipping the golden calf.

PROPI'TIATORY (*propitiatorium*, a means of atonement: *Lat.*), or MERCY-SEAT, the cover or lid of the ark of the covenant, lined within and without with plates of gold. It is said to have been a type of Christ.

PRO'POLIS (*Gr.: from pro*, in front of; and *polis*, a city), a thick odorous substance having some resemblance to wax, and used by bees for stopping the holes and crevices in their hives, to prevent the entrance of cold air, &c.

PROPOR'TION (*proportio: Lat.*), in a general sense, the relation of any one thing to another.——PROPORTION, in Mathematics, an equality of ratios; but the term is sometimes improperly used for *ratio.* The *arithmetical* ratio between two quantities consists in their difference: thus, the arithmetical ratio between 6 and 4 is 6 − 4, or 2. And four quantities constitute an *arithmetical proportion* when they form two ratios having equal differences: thus, 8 is to 6 as 4 is to 2, or more briefly 8 : 6 : : 4 : 2; because 8 − 6 = 4 − 2. The *geometrical* ratio between two quantities consists in their quotient; thus, the geometrical ratio between 4 and 7 is $\frac{4}{7}$. And four quantities constitute a *geometrical proportion*, when they form equal ratios, that is, two fractions having equal quotients: thus, 8 : 4 : : 6 : 3, because $\frac{8}{4} = \frac{6}{3}$. Quantities form an harmonic proportion when, of three numbers, the first is to the third as the difference of the first and second is to the difference of the second and third. Thus, 2, 3, 6, are in harmonical proportion; for 2 is to 6 as 1 is to 3. The *rule of proportion* enables us, when three terms of a geometrical proportion are given, to find the fourth. If more gives more, the proportion is said to be *direct;* if more gives less, and *vice versâ*, it is said to be *inverse*—but improperly, as only the mode of *stating* is affected by these circumstances. 'If 5 men build 20 yards of a wall in a week, how many yards would 7 men build?' is an example of the *direct* rule; for, the more men, the more yards of the wall they will build. But 'If 5 men build a wall in a week, how many days would 9 men require?' is an example of the *indirect:* since, the greater the number of men, the less time they require to perform a certain work.

PROPOSIT'ION (*propositio*, from *propono*, I point out: *Lat.*), in Logic, the part of an argument in which some quality, negative or positive, is attributed to a subject; as, 'man is mortal,' 'war is dreadful.'——In Mathematics, a statement in terms of either a truth to be demonstrated, or an operation to be performed. It is called a *problem* when something is to be done; and a *theorem* when something is to be proved.

PROPRÆ'TOR (*proprætor*, a vice-prætor: *Lat.*), a Roman magistrate, who, having discharged the office of prætor at home, was sent into a province to command there with his former prætorial authority. [See PROCONSUL.]

PRO RA'TA (*pro rata parte*, in a fixed part: *Lat.*—proportionally), in Commerce, a term sometimes used by merchants, for *in proportion*; as, each person must reap the profit or sustain the loss *pro rata* to his interest, that is, in proportion to his stock.

PRO RE NA'TA (*Lat.*), according to exigencies or circumstances: a phrase commonly used in medical prescriptions.

PROROGA'TION (*prorogatio*, from *prorogo*, I prolong: *Lat.*), a term used at the conclusion of a session of parliament, denoting its continuance from one session to another; as an *adjournment* is a continuation of the session from day to day.

PROSCE'NIUM (*Lat: from proskēnion: pro*, in front of; and *skēnē*, the scene: *Gr.*), in the Grecian and Roman theatres, the stage or place before the scene, containing the *pulpitum*, into which the actors came from behind the scenes to perform. In the modern theatre, it is the frontispiece, or part where the drop-scene separates the stage from the audience, and beyond the orchestra.

PROSCRIP'TION (*proscriptio*, from *pro-*

scribo, I publish in writing: *Lat.*), a punishment in use among the Romans, which had some analogy to our outlawry. The names of the *proscripti*, or persons proscribed, were posted up in tablets at the forum, that they might be brought to justice, a reward being promised to those who took them, and a punishment denounced against those who concealed them. Under the triumvirate many of the best Roman citizens fell by it. Cicero was slain in the proscription agreed upon by Octavius, Antony, and Lepidus.

PROSECU'TION (*prosecutus*, pursued: *Lat.*), in Law, the commencement and carrying on of a suit in a court of law or equity; or the process of exhibiting formal charges against an offender before a legal tribunal, and pursuing them to final judgment.——The person who institutes and carries on a criminal suit is called the *prosecutor*.

PROS'ELYTE (*prosēlutos*, literally one who has arrived at a place: *Gr.*), a new convert to some religion, system, or party. Thus a pagan converted to Christianity is a *proselyte;* and, although the word primarily refers to converts to some religious creed, we speak familiarly of *proselytes* to philosophical theories, &c.

PROSENNEAHE'DRAL (*pros*, beside; *ennea*, nine; and *hedra*, a base: *Gr.*), in Crystallography, having nine faces, on two adjacent parts of a crystal.

PROS'ODY (*prosōdia: Gr.*), that part of Grammar which treats of quantity, accent, and the laws of versification.

PROSONOMA'SIA (*Gr.*, from *prosonomazo*, I call by name), a figure in Rhetoric, in which allusion is made to the similarity of sound in several names or words.

PROSOPOLEP'SY (*prosōpolēpsia:* from *prosōpon*, a person; and *lēpsis*, a seizing: *Gr.*), a word used by some writers on ethics to express a premature opinion or prejudice against a person, formed in consequence of his external appearance.

PROSOPOPŒ'IA (*prosōpopoïïa:* from *prosōpon*, a person; and *poieo*, I make: *Gr.*), a figure in Rhetoric, in which qualities or things inanimate are personified and addressed, as if endowed with human form and sentiments.

PROSPEC'TUS (a view: *Lat.*), the outline or plan of a literary work, containing the general subject or design, with the necessary particulars as to the mode of publication. The word *prospectus* has recently been adopted in announcing many undertakings and schemes not literary.

PRO'STYLE (*prostulos:* from *pro*, in front of; and *stulos*, a column: *Gr.*), in Architecture, a range of columns in the front of a temple.

PROTA'SIS (*Gr.*, from *proteino*, I stretch out in front), in the ancient Drama, the first part of a comic or tragic piece, in which the several members of the *dramatis personæ* were shown, and the subject or plot entered on. It is opposed to the *epitasis*, or part where the plot thickens.

PROTEA'CEÆ (*Proteus*, in Mythology, remarkable for his power of assuming different shapes), in Botany, a natural order of exogenous shrubs and trees, natives chiefly of the Cape of Good Hope and Australia. The flowers are apetalous. The great diversity of appearance presented by the genera suggested the name of the order. The principal genera are *Leucadendron* (to which the Silver tree of the Cape of Good Hope belongs), *Protea*, *Grevillea*, *Hakea*, *Banksia*, and *Dryandra*. The order affords little that is useful to man.

PROTEC'TOR (*protego*, I defend: *Lat.*), in English History, a title assumed at various times by those who seized the regal power, without adopting its name: first by Richard, Duke of York, in 1453: next by the Duke of Somerset, in 1548; and then by Cromwell, in 1653. The last was nominally, but not really, succeeded by his son.

PROT'EST (*protestor*, I declare in public: *Lat.*), a formal and solemn declaration of opinion, given in writing, commonly against some act: as, the *protest* of lords in parliament; or the formal and recorded dissent of a minority against the majority of any public body.——PROTEST, in Commerce, a formal declaration made by a notary public at the request of the holder of a bill of exchange, on account of the non-payment of it, against the drawer and others concerned; and a demand of the exchange, charges, damages, and interest. It is written on a copy of the bill, and notice of it is given to the indorser, by which he becomes liable for the amount with charges and interest. There is also another kind of *protest*, which is a writing attested by a justice of the peace or consul, drawn by the master of a vessel, stating the circumstances through which his ship has suffered, and showing that the damage was not occasioned by his misconduct or neglect.

PROT'ESTANT (same *deriv.*), a name first given in Germany to those who adhered to the doctrine of Luther, because, in 1529, they protested against a decree of the emperor Charles V. and the diet of Spires, declaring that they appealed to a general council. This name was afterwards extended to the Calvinists, and is now common to all who belong to the reformed churches. The great principles upon which all protestants, however they may differ in other respects, agree, are the right of private judgment, and the rejection of any infallible head of the church or ultimate authority in pope or council. Protestants differ among themselves as to whether the Bible alone is to be taken both as a rule of faith and its own interpreter, or the opinions of the fathers of the first three centuries also are to be appealed to. [See REFORMATION.]

PRO'TEUS, in Mythology, a marine deity, whose distinguishing characteristic was the faculty of assuming different shapes. Hence we denominate one who easily changes his form or principles a *Proteus*.——In Zoology, a genus of amphibia, including the *Proteus anguinus*, an aquatic animal which possesses both lungs and permanent gills. Sir Humphry Davy, who saw one of them in a lake in the beautiful grotto of Maddalena, at Adelsburg, in Illyria, thus describes it: 'At first you might suppose it to be a lizard, but it has the motions of a fish. Its head, and the lower part of its body, and its tail, bear a strong resemblance to those of the eel; but it has no fins; and its curious branchial organs are not like the gills of fishes; they form a singular vascular (net-like) structure, almost like a crest, round the throat, which may be removed without occasioning the death of the animal, which is likewise furnished with lungs. With this double apparatus for supplying air to the blood, it can live either below or above the surface of the water. Its fore feet resemble hands, but they have only three claws or fingers, and are too feeble to be of use in grasping or supporting the weight; the hinder feet have only two claws or toes, and in the larger specimens are found so imperfect as to be almost obliterated. It has small points in place of eyes, as if to preserve the analogy of nature. It is of a fleshy whiteness and transparency in its natural state; but when exposed to light, its skin gradually becomes darker, and at last gains an olive tint. Its nasal organs appear large; and it is abundantly furnished with teeth, from which it may be concluded that it is an animal of prey; yet, in its confined state, it has never been known to eat, and it has been kept alive for many years, by occasionally changing the water in which it was placed.'

PROTHON'OTARY (*proto-notarius*, first notary: *Lat.*: from *prōtos*: *Gr.*, and *notarius*: *Lat.*), a title which had its origin in the Byzantine empire.——An officer in the court of king's bench, and also in that of common pleas, until changes were made in these courts.——*Apostolical prothonotaries*, in the church of Rome, are twelve persons constituting a college, who receive the last wills of cardinals, are employed in the proceedings necessary for the canonization of saints, &c.

PROT'OCOL (*prōtos*, first; and *kolla*, glue: *Gr.*), the first draft of a deed, contract, or instrument. The word is generally applied to such writings as are of a diplomatic character.

PRO'TOMARTYR (*proto-martūr*: *Gr.*), a designation given to Stephen, the first Christian martyr; and used also for the first sufferer in any cause, religious or political.

PRO'TOPOPE, the imperial confessor, an officer of the holy directing synod, the supreme spiritual court of the Greek church in Russia. [See POPE.]

PROTOSUL'PHATE, in Chemistry, the combination of sulphuric acid with a protoxide.

PRO'TOTYPE (*prōto-tupos*: *Gr.*), an original or model after which anything is formed.

PROTOX'IDE, in Chemistry, a substance combined with oxygen in the first degree.

PRO'TOZOA (*prōtos*, first; *zōon*, animal: *Gr.*), a sub-kingdom of animals comprising the lowest forms of the kingdom. They are all aquatic, and the majority are of minute size. They may be divided into six groups, viz.:—1. *Rhizopoda*, including FORAMINIFERA. 2. POLYCYSTINA. 3. *Spongiadæ* [see SPONGES]. 4. *Thalassicollidæ*. 5. *Gregarinidæ*. 6. INFUSORIA. All except the last group are destitute of distinct organs; and, as the *Infusoria* possess a mouth and digestive apparatus, and have power to move rapidly, it is not improbable that hereafter they may cease to be classed with the *Protozoa*, of which many of the forms are of such low organization that they have frequently been placed in the vegetable kingdom.

PROVEDO'RE (*proveditore*: *Ital.*), a purveyor, or one employed to procure supplies for an army.

PROVEN'ÇAL, a corrupted form of Latin employed in France during the middle ages, and much used for poetical purposes. There were two dialects, both corruptions of the Latin: the Langue d'Oil, ancient northern French, of which the lately discovered song of Eulalia, written before the tenth century, is a specimen; and the Langue d'Oc, employed in the south of France, of which the song of Boethius, usually attributed to the tenth century, is the earliest example. The river Loire was the boundary between these two dialects. It was the latter, or Langue d'Oc, which was called Provençal, and this was the dialect employed by the Troubadours, whilst the Trouvères used the Langue d'Oil.

PROV'ENCE or PROV'INCE ROSE, a gardener's name for a tribe of cultivated roses, known also as cabbage roses, of which the *Rosa centifolia*, which has been found wild in the Caucasus, is the parent. The moss rose is one of the numerous varieties.

PROV'ERB (*proverbium*: *Lat.*), a pithy sentence in common use, embodying or applying a truth of practical value. A proverb has been styled the wisdom of many, and the wit of one. Every country has its proverbs, and amongst the quaintest are those of Spain, of which Sancho Panza made abundant use.——In Dramatic Literature, chiefly French, a short piece, in which some proverb or popular saying is made the foundation of the plot.——BOOK OF PROVERBS, a canonical book of the Old Testament, containing a great variety of wise maxims, practical truths, and excellent rules for the conduct of all classes of men. The first twenty-four chapters are attributed to king Solomon; the five succeeding chapters are a collection of several of his proverbs, made by order of king Hezekiah; and the last two bear the names of different authors.

PROV'INCE (*provincia*: *Lat.*), among the Romans, a country of considerable extent, which, being reduced under their dominion, was new modelled according to the pleasure of the conquerors, subjected to the command of annual governors sent from Rome, and obliged to pay such taxes and contributions as the senate thought fit to demand. Provinces had the appellation of *consular* or *prætorian*, according as they were governed by consuls or prætors.——Among the moderns, a country belonging to a kingdom or state, either by conquest or colonization, usually situated at a distance from the kingdom or state, but more or less dependent on and subject to it. Such are Canada, Novia Scotia, &c., in reference to Great Britain.——PROVINCE, in Geography, a division of a kingdom or state, comprising several cities, towns, &c., all under the same government, and usually distinguished by the extent either of the civil or ecclesiastical jurisdiction.——In the ecclesiastical division of England, there are two *provinces*, viz. those of Canterbury and York, under the jurisdiction of their respective archbishops.

PROVIN'CIALISM (*provincialis*, pertaining to a province: *Lat.*), a mode of speech peculiar to a province or district remote from the mother country or from the metropolis.

PROVIS'IONAL, intended for present need or for a temporary occasion; as, a *provisional* government, a *provisional* treaty, &c.

PROVI'SO (it being provided: *Lat.*), or CONDITION, in Law, an article or clause in a statute, deed, or writing, limiting something that has gone before, or introducing a condition. It usually begins, 'Provided that.'

PROV'OST (contracted from *præpositus*, placed first: *Lat.*), in a general sense, a person who is appointed to preside over or superintend; as, the *provost* of a college. ——PROVOST, in Scotland, is equivalent to our mayor; and the chief magistrates of Edinburgh and Glasgow are termed *Lord Provost*. [See UNIVERSITY.]

PROVOST-MARSHAL of an army, an officer appointed to arrest and secure deserters and other criminals, to execute the sentences of courts-martial, to hinder the soldiers from pilfering, to regulate weights and measures, &c. There is a similar officer in the royal navy, who has the charge of prisoners taken at sea.

PROW (*prōra: Gr.*), in Nautical language, the beak or pointed cutwater of a galley, &c. The upper part is usually furnished with a grated platform. Also, the fore-part of a ship.

PROX'IMATE CAUSE (*proximus*, the nearest: *Lat.*), that which immediately precedes and produces the effect, as distinguished from the *remote* or *predisposing* cause.

PROX'Y (contracted from *procuracy*—from *procuratio*, a taking charge of: *Lat.*), one who acts as a substitute for another. ——In England, any member of the house of lords may commission another peer to vote for him as his *proxy* in his absence. Proxies cannot be used when the house is in committee, nor can a proxy sign a protest. No peer can hold more than two proxies.

PRUD'HO'MME (*Fr.; from prudens homo*, a prudent man: *Lat.*). Tribunals in France during the middle ages, composed of citizens acting as arbiters of disputes, inspectors of police, &c., were termed *councils of prud'hommes*. A court of this kind was reestablished at Lyons in 1806.

PRU'NING, in Horticulture, the lopping off the superfluous branches of trees, either to improve their appearance, or to cause them to bear better fruit.

PRU'NUS (*Lat.*), in Botany, a genus of plants belonging to the natural order *Rosaceæ*, including the plum (*Prunus domestica*), the sloe (*P. spinosa*), the cherry-laurel (*P. Laurocerasus*), and other species.

PRURI'GO (*Lat.*), in Medicine, a cutaneous disease, in which there is itching, and an eruption of small pimples. The term is applied to irritation caused in various parts of the body from vermin, worms, &c.

PRUS'SIAN BLUE, a pigment of a beautiful blue colour, a combination of iron and cyanogen. Good Prussian blue is known by the following tests: it feels light in the hand, adheres to the tongue, has a dark, lively, blue colour, and gives a smooth deep trace; it should not effervesce with acids, which it will do, if adulterated with chalk, nor become pasty with boiling water, which will be the case when adulterated with starch. It is obtained from organic matters abounding in nitrogen, and is used in calico-printing.

PRUS'SIATE, in Chemistry, a salt formed by the union of prussic or hydrocyanic acid with different bases. Thus, the *prussiate* of potash, which is much used as a test for various metals, particularly iron.

PRUS'SIC A'CID, in Chemistry, one of the deadliest poisons known. It is a compound of cyanogen and hydrogen, hence also called *hydrocyanic acid*. When even moderately strong, its fatal effects are so rapid, that it is impossible to prevent them by any antidote. The smallest quantity of the pure acid applied to the eye of a cat, &c., causes instantaneous death. If there is the least hope of saving one who has swallowed it, a solution of chlorine, which decomposes it, should be administered; also ammonia, which both combines with it and acts as a stimulant. It is a narcotic; and, given with great caution, it may be used as a powerful sedative and anti-irritant, especially in whooping-cough. It is this acid that gives a peculiar flavour to the kernels of peaches and bitter almonds and the leaves of the cherry laurel.

PRYTANE'UM (*prutaneion*, from *prutanis*, a president: *Gr.*), in Grecian Antiquity, the senate-house in Athens, where the council of the *prytaneis*, or committee of fifty, assembled, and where those who had rendered any signal service to the commonwealth were maintained at the public expense.

PSALM (*psalma*, from *psallo*, I play a stringed instrument: *Gr.*), a divine song or hymn. The term is chiefly appropriated to the hundred and fifty *Psalms of scripture*, a canonical book of the Old Testament. The Psalms were called by the Jews *Thehillim* (praises), and were divided by them into five books, ending respectively with the 40th, 71st, 88th, 105th, and last. Most of them have a particular title, signifying either the name of the author, the person who was to set it to music or sing it, the instrument that was to be used, or the subject and occasion of it. Some have imagined that David was the sole author of the Book of Psalms; but the titles of many of them prove the contrary. Some of the psalms were apparently written by Solomon ; a few belong to the reigns of the kings immediately succeeding him ; and several to the mournful days of the Babylonish captivity, and of the return, especially those headed 'For the sons of Korah,' most of which are probably by the same author. Finally, a few belong to the age of the Maccabees.

PSAL'TERY (*psaltērion*, a stringed instrument: *Gr.*), a musical instrument used by the Hebrews, the form of which is not known. It is supposed to have resembled both the harp and the lyre.

PSAM'MITE (*psammos*, sand: *Gr.*), in Mineralogy, a species of micaceous sandstone.

PSEUDEPIG'RAPHY (*pseudēs*, false ; and *epigraphē*, an inscription : *Gr.*), the assigning to an author works which he did not write, to secure for them a wide circulation and an undeserved authority. It was carried by the Christians of the fourth and following centuries to a great extent ; and hence it is extremely difficult to distinguish the spurious works of the fathers from the true.

PSEU'DO (*pseudēs*, false : *Gr.*), a prefix used in the composition of many words, to denote *false* or *spurious ;* as, a *pseudo*-prophet, or false prophet, &c.

PSEUDOBLEP'SIS (*pseudēs*, false ; and *blepo*, I see: *Gr.*), in Medicine, a defect of vision, in which specks, network, colours, and imaginary bodies, float or dance before the eyes. Distorted and double vision are its most ordinary accompaniments. Sometimes it depends on nervous irritation ; at others, on organic derangement.

PSEUDODIP'TERAL (*pseudēs*, false ; and *dipteros*, having a double peristyle : *Gr.*), in Architecture, a building in which the distance from each side of the cell to the columns on the flanks is equal to two intercolumniations, the intermediate range of columns being omitted.

PSEUDOISODO'MUM (*pseudēs*, false ; and *isodomos*, built in equal courses : *Gr.*), in Ancient Architecture, masonry in which the height, thickness, and length of the courses are different.

PSEU'DO-METAL'LIC (*pseudo-metallikos : Gr.*), in Mineralogy, an epithet for a kind of lustre, which is perceptible only when held towards the light.

PSEUDOMORPH'OUS (*pseudēs*, false; *morphē*, shape : *Gr.*), a term applied to a mineral which owes its form to some extraneous cause, not to crystallization.

PSEU'DOSCOPE (*pseudēs*, false; and *skopeo*, I view : *Gr.*), a name given to the stereoscope when employed to produce 'conversions of relief.' The pseudoscope consists of two reflecting prisms, placed in a frame with adjustments, so that, when applied to the eyes, each eye may separately see the reflected image of the projection which usually falls on that eye. The instrument being directed to an object, and adjusted so that the object shall appear of its proper size and at its usual distance, the distances of all other objects are inverted, all nearer objects appearing more distant, and all more distant objects nearer; and it constitutes the conversion of relief.

PSIT'TACUS (*Lat.; from psittakos : Gr.*) [See PARROT.]

PSO'AS MUS'CLE (*psoai*, the loins : *Gr.*), a large muscle, on the fore part and sides of the lumbar vertebræ. Its use is to bend the thigh forward, and assist in turning it outwards.

PSYCHOL'OGY (*psuchē*, the soul; and *logos*, a discourse: *Gr.*), the doctrine of the nature and properties of the soul; or a treatise upon it. In a more extended sense, it is *mental philosophy*.

PSY'CHOMANCY (*psuchē*, the soul; and *manteia*, prophecy: *Gr.*), a kind of divination, in which the spirits of the dead were supposed to appear and communicate desired information.

PTAR'MIGAN (*tarmachan: Gael.*), the *Lagopus mutus*, called also the *white grouse*. It is the smallest species of British grouse. The colour of its plumage is a pale brown or ash, elegantly marked with dusky spots or minute bars; the bill is black, and the belly and wings are white. It is occasionally seen on the summits of mountains in Scotland, but it has ceased to be an inhabitant of England. It is abundant in the northern parts of Scandinavia, whence a great number are sent to the English markets.

PTERODAC'TYLUS (*pteron*, a wing; and *daktulos*, a finger: *Gr.*), a genus of reptiles whose remains have been found in oolitic strata. They were flying lizards, the bones of the fore legs being much elongated, and connected by skin with the hind legs, as amongst the bats.

PTEROP'ODA (*pteron*, a wing; *poda*, feet: *Gr.*), a class of mollusca which live in the open sea both of the tropics and colder latitudes, affording food to whales and sea birds. The chief characteristic by which they are separated from other mollusca is the possession of a pair of fins, one at each side of the mouth or neck. Their shells, when present, are glassy and translucent, differing greatly in shape. The northern *Clio*, the chief food of the right-whale, is a pteropod.

PTOLEMA'IC SYS'TEM, the system of astronomy invented by Claudius Ptolemæus, a celebrated astronomer and mathematician of Pelusium, in Egypt, who lived in the beginning of the second century of the Christian era. It supposes that the earth is fixed in the centre of the universe, and that the sun, moon, planets, and stars revolve around it, from east to west, once in twenty four hours. This theory was received for ages; astronomers having no notion of any other system but that of which our sun is the centre, nor of any other world but the earth on which we live. They imagined that all the fixed stars were contained in one concave sphere, and that the *primum mobile* was circumscribed by the empyreal heaven, the blissful abode of departed souls. [See ASTRONOMY.]

PTY'ALISM (*ptualismos*, from *ptualon*, spittle: *Gr.*), in Medicine, an unnatural or copious flow of saliva; *salivation*.

PUBES'CENCE (*pubescens*, downy: *Lat.*), in Botany the hairy or downy substance growing on certain vegetable productions: hence a *pubescent* plant.

PUB'LICAN (*publicanus: Lat.*), among the Romans, a farmer of the taxes and public revenues. The inferior members of this class were looked upon as oppressors, and were consequently regarded by the Jews and other tributary nations with no small degree of detestation.——Under the modern term of *publicans* are comprised inn-keepers, hotel-keepers, alehouse-keepers, keepers of wine vaults, &c.

PUB'LICIST (*publicus*, pertaining to the state: *Lat.*), a writer on the laws of nations.

PUD'DING-STONE, a conglomerate, consisting of oblong and rounded pebbles of flint, about the size of almonds, imbedded in a hard siliceous cement. The pebbles are usually black, and the cement a light yellowish brown. It is capable of receiving a very high polish, and is used in ornamental works. It is found chiefly in Essex.

PUDD'LING, a process in the manufacture of iron effected by stirring the melted metal with an iron rod in order to bring it into contact with the air and free it from carbon.

PUER'PERAL FE'VER (*puerperus*, pertaining to childbirth: *Lat.*), in Medicine, a fever attended by peritoneal inflammation, which comes on about the third day after delivery. It is a dangerous disease, is most common in the autumn, and seems infectious. It sometimes assumes a typhoid character.

PUG MILL, an apparatus used in the preparation of clay, with a view to increase its plasticity and fit it for manufacture into earthenware, bricks, and other articles.

PU'LEX (*Lat.*), the flea. [See FLEA.]

PUL'LEY (*poulie: Fr.*), one of the six mechanical powers, consisting of a small wheel with a grooved edge and turning on an axis.

PUL'MONARY or PULMON'IC (*pulmo*, the lungs: *Lat.*), pertaining to the lungs; as, a *pulmonary* disease.

PULSE (*pulsus*, a beating: *Lat.*), a motion of the blood-vessels, produced by the alternate dilatation and contraction of the arteries, arising from the impulse given to the blood by the action of the heart. The average rate of pulsation in a healthy infant, for the first year, is from 120 to 108 strokes per minute; for the second year, from 108 to 90; for the third, from 100 to 80; from the seventh to the twelfth, about 70. In febrile diseases, the pulse sometimes reaches to 140, and is then difficult to count. Its range in a healthy adult is between 60 and 80; but it is extremely capricious, and is modified by slight mental affections, indigestion, &c., so that the peculiarities of individuals must be carefully considered before conclusions can be drawn from it. Certain modifications of it are termed *hard*, *soft*, *full*, *wiry*, &c.——PULSE, in Botany, the seed of leguminous plants, as beans, peas, &c.

PULSE GLASS, a tube about a quarter of an inch in diameter, and five or six inches long, with a bulb at each end; and about half filled with spirit of wine, the air having been carefully removed from it before it was hermetically sealed. When held in an inclined position, one of the bulbs being grasped in the hand, the expansion of the vapour which is generated there, and afterwards condensed at the other end, causes the liquid to rise and fall in the tube—to *pulsate*; a snapping noise being produced.

PUL'VINATED (*pulvinatus*, cushion-shaped: *Lat.*), an Architectural term, expressive of a swelling in any portion of an order; as, for example, in the modern Ionic frieze.

PU'MA, the *Felis concolor*, a rapacious quadruped, called sometimes the American lion. When mature it is about five feet long and of a fawn colour. It ranges from the forests under the equator to Tierra del Fuego. It preys on horses, cattle, deer, and other wild animals, usually springing upon the shoulders and pulling the head back by one of its paws, until the vertebræ are broken. After eating its fill, says Darwin, the puma covers the carcass with large bushes, and lies down to watch it. This habit is often the cause of its being discovered; for the condors whirling in the air every now and then descend to partake of the feast, and, being angrily driven away, rise all together on the wing. It is then known that a 'lion' is watching its prey, and men and dogs hurry to the chase. It is described as being very crafty; when pursued it turns on its former track, and then, suddenly making a spring on one side, waits there until the dogs have passed by.

PUM'ICE-STONE (*pumex: Lat.*), a porous volcanic product, composed chiefly of silica and alumina, with traces of potash, soda, and oxide of iron. It floats on water, is hardly acted on by the acids, and may probably be looked on as stony froth. It is found in almost all volcanic countries; and is known to be produced especially by Etna, Vesuvius, and Hecla, during the eruptions of which it is thrown up in great abundance. It is used for polishing ivory, wood, marble, metals, glass, &c., as also skins and parchment.

PUMP (*pompe: Fr.*), an hydraulic engine for raising water by exhausting the incumbent air from a tube or pipe; in consequence of which, the water rises in the tube by means of the pressure of the air on the surrounding water. There are *suction-pumps*, *forcing pumps*, *air-pumps*, &c. A *chain-pump* consists of a chain which is furnished with a sufficient number of flat pistons at proper distances; these, working on two wheels, pass down through one tube and up through another, carrying up the water along with them. The chain-pump is well adapted for ships; it acts merely mechanically, and is not liable to be choked by sand, &c.

PUMP'KIN or POM'PION, the fruit of plants belonging to the genus *Cucurbita*, nat. ord. *Cucurbitaceæ*, which see.

PUN, a play upon words, the wit of which depends on the resemblance between the sound and syllables of two or more words, which have different and even opposite meanings. [See PARONOMASIA.]

PUNCTUA'TION (*punctum*, a point: *Lat.*), in Grammar, the discriminating use of certain marks adopted to distinguish the clauses of a period; sometimes with reference to the sense, and at others to the grammatical construction. Thus, a full point (.) closes a perfect sentence; a colon (:) divides parts of a sentence, separated by semicolons; a semicolon (;) distinguishes the more important members of a sentence, as when one is an inference from, qualification, illustration, or explanation of another; and a comma (,) separates parts subordinate to the semicolon. A paragraph, which may include several periods, includes a branch of the subject or argument. A question is indicated by (?); an exclamation by (!); and it is sometimes convenient to include a collateral circumstance in a parenthesis ( ). There are other marks not so easily defined. The ancients were scarcely acquainted with *punctuation*.

PUNCTURA'TION (*punctura*, a pricking: *Lat.*), in Surgery, a piercing of the skin, &c., with needles, to relieve the painful diseases arising from tension, obstruction, &c.

PUN'DIT, in Hindostan, a learned Brahmin; one versed in the Sanscrit language, and in the science, laws, and religion of the country. The term is used ironically with us, to designate one who makes a show of learning without possessing its reality.

PU'NIC, pertaining to the Carthaginians, or their language; as the *Punic wars*, contests carried on between the Romans and Carthaginians for more than three centuries, and which ended in the destruction of Carthage, B.C. 147.——Also, a term implying treacherous, deceitful; as *punic* faith.

PUN'ISHMENT (*punio*, I punish: *Lat.*), the infliction of pain or personal suffering, according to law, for crimes; intended as an example to deter others, and a means of correcting the offender

PUN'KAH, an apparatus employed in India to cause the air to circulate through the rooms of the houses and thereby keep down the temperature.

PU'PA (a puppet: *Lat.*), in Entomology, the second stage of an insect's life, intermediate between the maggot or larva and the perfect insect. In the case of butterflies the names of chrysalis and aurelia are given to this metamorphosis. In the pupa state the insect is covered with a tough skin which more or less conceals the organs; and it remains quite helpless, without power to move, until the time arrives for its next metamorphosis, when it becomes the complete insect. When the larva is about to change its form, it seeks out some place of concealment, sometimes in the earth, and often about walls. Some species attach themselves by a few threads to their hiding-place; others envelope themselves entirely in a cocoon of silk. The length of time for continuing in this mummy-like condition varies with the species; but in this country most insects pass the winter in the pupa form.——PUPA, a genus of small land snails; so called from their resemblance to the *pupa* of an insect.

PU'PIL (*pupula*, literally a *dim.* of *pupa*, a puppet: *Lat.*), in Anatomy, the round aperture in the middle of the iris. It is so called because it reflects the diminished image of the person who looks into it.

PUPIP'ARES (*pupa*; and *pario*, I bring forth: *Lat.*), a term applied to insects, such as the *Hippobosca equina*, or forest fly, which bring forth their young in the condition of a *pupa* or *nymph*.

PUPIV'ORES (*pupa*; and *voro*, I devour: *Lat.*), a tribe of hymenopterous insects, comprehending those of which the larvæ live parasitically in the interior of the larvæ and pupæ of other insects.

PURA'NAS. These are metrical compositions in Sanscrit, embracing a collection of legends and traditions touching the origin and history of the holy places of India, or of the religious sects. They were intended to be read publicly to the people assembled at great festivals. The existing Puranas have been formed out of much older compositions, which have been lost.

PURGA'TION (*purgatio*, from *purgo*, I make clean: *Lat.*), the act or operation of clearing oneself of a crime; a mode of trying persons accused of any crime, which was formerly in practice.

PUR'GATORY (*purgatorius*, cleansing: *Lat.*), a supposed place or state after death, where, according to the Roman Catholics, the souls of the faithful are purified from the sins which they carry with them out of this life, before they are admitted to a state of perfect bliss. It is assumed to differ from hell in little except that its pains are not eternal, and that they may be shortened, or even terminated, by masses, indulgences, &c.

PURIFICA'TION (*purificatio*, from *purifico*, I make clean: *Lat.*), the act or operation of cleansing ceremonially, by removing any pollution or defilement. Purification by washing was common to the Hebrews and to pagans; and the Mohammedans always use it previous to devotion.

PU'RIM, among the Jews, the *feast of lots*, instituted to commemorate their deliverance from the machinations of Haman.

PU'RITAN, a name formerly given to dissenters from the church of England, who professed to follow the pure word of God, in opposition to all traditions and human institutions.

PUR'LIN, in Architecture, a piece of timber extending from end to end of a building or roof, across and under the principal rafters, to support them in the middle.

PUR'PURA (purple: *Lat.*), in Medicine, an eruption of small purple specks and patches, produced by extravasation of blood under the cuticle.——In Zoology, the generic name of the univalve gasteropod which secretes the purple fluid that formed the base of the Tyrian dye.

PUR'PURE (*pourpre*, purple: *Fr.*), in Heraldry, one of the five colours of armorial bearings, compounded of gules and azure, bordering on violet. It is represented in engraving by diagonal lines from right to left.

PUR'PURIC A'CID, in Chemistry, an acid produced by the action of nitric upon uric acid. It forms, with most bases, a deep red or *purple* compound.

PUR'SER, in the Navy, an officer on board a man-of-war, whose principal duty is to keep the ship's accounts; but who takes charge of the provisions, and attends to their preservation and distribution among the officers and crew.

PUR'SUIVANT (*poursuivant: Fr.*), in Heraldry, the lowest order of officers at arms. The pursuivants are properly attendants on the heralds when they marshal public ceremonies. They are a kind of probationers, in the heralds' college, and are styled *Portcullis*, *Rouge Dragon*, *Blue Mantle*, and *Rouge Croix*.

PUS (*Lat.*), the white or yellowish matter issuing from a sore, which usually precedes the healing; and in such cases is termed healthy or good pus. Examined in a microscope, it is found to consist of globules, and a transparent colourless fluid. Its specific gravity is greater than that of water; exposed to heat, it evaporates to dryness, but does not coagulate.

PUT'CHOCK, the root of a plant that grows abundantly in Sinde. When burned, it yields a thin smoke, and a grateful and diffusive smell. The Chinese beat it into a fine powder, which they burn as incense in the temples of their gods.

PUTREFAC'TION (*putrefacio*, I make rotten: *Lat.*), the spontaneous decomposition of organic substances, accompanied by the evolution of fœtid and noxious gases. It is a species of *fermentation*. Animal matter, containing more nitrogen, gives rise to more offensive products than vegetable: unless nitrogen is present, putrefaction will either not take place, or it will progress very slowly. Most animal substances generate ammonia or ammoniacal compounds: the other results of putrefaction are various combinations of hydrogen, particularly carburetted hydrogen, along with complicated and dangerous compounds, in some of which sulphur and phosphorus are present; all of them, however, are decomposed and rendered harmless by chlorine. The production of putrefaction requires a number of conditions: it cannot take place without a certain temperature, and hence does not occur below the freezing point; it requires moisture, and hence is prevented by substances that absorb or remove water, which explains the efficacy of salt, sugar, alcohol, &c.; it is prevented also by those—such as the tanning principle—which form new combinations with the organic matter: it requires access of oxygen, and, therefore, exclusion of the air prevents it. Vitality hinders putrefaction: as soon as the body or a part of it dies, *mortification*, that is, putrefaction, sets in. The ancient Egyptians seem to have been well acquainted with many of the means required to prevent putrefaction, as is proved by their mummies remaining perfect for so many hundred years.——*Antiseptic processes.* In curing provisions, the ordinary means employed are, drying, smoking, salting, and pickling. Grain of all kinds, as well as flour, may be kept for an indefinite length of time, if they are kiln-dried, put up in vessels or chambers free from damp, and excluded from the air. Well-dried grain is not liable to the depredations of insects. Fruits may be preserved in various ways. Pears, apples, plums, &c., should be gathered in a sound state, altogether free from bruises, and plucked in dry weather before they are fully ripe. One mode of preservation is to expose them in an airy place, to dry a little, for eight or ten days, and then to lay them in dry sawdust or chopped straw, spread upon shelves in a cool apartment, so as not to touch each other. Another method consists in surrounding them with fine dry sand in a vessel which should be made air-tight and kept in a cool place. Herbs, cabbages, &c., may be kept a long time in a cool cellar, provided they are covered with dry sand. Tuberose and other roots are preserved better in an airy place where they may dry a little without being exposed to the winter's frost. A partial drying is given to various vegetable juices by evaporating them to the consistence of a syrup, called a *rob;* in which so much of the water is dissipated as to prevent them from running into fermentation. The fruits are to be crushed, and squeezed in bags to expel the juices; which must then be inspissated either over the naked fire, or in a water or steam bath, in the air or *in vacuo:* sometimes a small proportion of spices is added, to prevent mouldiness.

PUT'TY (*potée: Fr.*), a kind of cement, made of whiting and linseed-oil ground together into a paste, which is used by glaziers in fastening the panes of glass, and by painters in stopping crevices.——Also, a fine cement, made of lime only, used by plasterers; it differs from *fine stuff* in containing no hair.

PUZZOLA'NO, a volcanic rock, yielding an excellent cement, which resists moisture. It is found at *Puzzuoli*, near Naples, &c.

PYC'NITE (*puknos*, compact: *Gr.*), in Mineralogy, the *schorlous topaz:* it usually appears in long irregular prisms or cylinders, longitudinally striated, and united in bundles.

PYC'NOSTYLE (*puknostulos:* from *puknos*, close; and *stulos*, a column: *Gr.*), in Ancient Architecture, a species of building in which the columns stand very close to each other, only one diameter and a half of the column being allowed to each intercolumniation.

PYG'MY (*pugmaios*, from *pugmē*, a measure of length—the distance from the elbow to the knuckles, about 13½ inches: *Gr.*), an appellation given by the ancients to a fabulous race of beings, said by some authors to have lived in India, by others in Ethiopia, &c., and to have waged perpetual war with the cranes, by whom they were ultimately destroyed. The fable, no doubt, had its origin in the stunted growth of particular races, on account of a severe climate or great privations. The term *pygmy* is now restricted to a species of ape, the *Simia Troglodytes*, and to a *dwarf*.

PYLO'RUS (*pulōros*, from *pulē*, an entrance; and *ouros*, a guard: *Gr.*), in Anatomy, the right or lower orifice of the stomach, which is connected with, and, as it were, guards the entrance into the intestines.

PY'RACIDS (*pur*, fire: *Gr.*), acids, generated by that process of decomposition which several vegetable acids undergo when subjected to the action of heat. Thus, gallic acid, in such circumstances, yields *pyrogallic acid;* tartaric acid, *pyrotartaric acid*, &c.

PYRAL'LOLITE (*pur*, fire; *allos*, another; and *lithos*, a stone: *Gr.*), a mineral which undergoes various changes of colour when heated. It is greenish, and occurs both massive and in crystals.

PYR'AMID (*puramis: Gr.*), a solid body standing on a triangular, square, or polygonal base, and terminating at the top in a point termed the apex. Its lateral surface consists of three or more plane triangles. The *Pyramids of Egypt* are noble monuments of Egyptian grandeur. They are forty in number, and are situated near Memphis. The largest is 480 feet in height, that is, 43 feet higher than St. Peter's at Rome, and 136 feet higher that St. Paul's in London. It covers more than thirteen acres, and, if solid, would contain more than three million cubic yards of stone, that is, six times as much as what is contained in Plymouth breakwater. According to the information given by the priests to Herodotus, 100,000 men were twenty years constructing it.

PYRAM'IDOID (*puramis*, a pyramid; and *eidos*, form: *Gr.*), in Geometry, a solid figure, formed by the rotation of a semi-parabola about one of its ordinates. It is called also a *parabolic spindle*.

PYR'ENITE, a mineral of a greyish-black colour, found in the Pyrenees, and considered as a variety of *garnet*.

PYRETOL'OGY (*puretos*, a fever; and *logos*, a discourse: *Gr.*), the doctrine of fevers; or a treatise on their nature, effects, &c.

PYRI'TES (*purites*, from *pur*, fire: *Gr.*), in Mineralogy, sulphurets of copper and iron. *Copper pyrites* is the principal ore of copper, and *iron pyrites* is a most abundant ore of iron; it is of a brass-yellow colour. Iron pyrites, exposed to the air, particularly when heated, absorbs oxygen, and yields sulphate of iron or *green vitriol*. These minerals have obtained their name either from igniting spontaneously, or because they are sufficiently hard to strike fire with steel. They occur massive, disseminated, and frequently crystallized.

PYRO-ACET'IC SPI'RIT, in Chemistry, a liquid obtained by subjecting to dry distillation the acetates of copper, lead, alkalis, and earths. It is very combustible, and burns with a brilliant flame, without smoke. It is used for dissolving the gum-resins with which the bodies of hats are stiffened, and is now called *acetone*, which see.

PYROLIG'NEOUS A'CID, in Chemistry, an acid obtained from beech and other woods by destructive distillation. It is a liquid of the colour of white wine, of a strongly acid and slightly astringent taste. It is an antiseptic, and serves instead of wood smoke, of which it is the most active constituent, for preserving animal substances. It is an impure acetic acid, or vinegar.

PYROL'OGY (*pur*, fire; and *logos*, a discourse: *Gr.*), the natural history of heat; or a treatise on that subject.

PYROM'ALATE, in Chemistry, a compound of pyromalic acid and a salifiable base.

PYROMAL'IC A'CID, in Chemistry, a substance obtained from the distillation of malic acid.

PYROM'ETER (*pur*, fire; and *metron*, a measure: *Gr.*), an instrument for measuring high temperatures, or degrees of heat above those indicated by the mercurial thermometer. Wedgewood's pyrometer consists of porcelain, and is founded on the principle that clay progressively contracts in its dimensions in proportion as it is exposed to higher degrees of heat. But its indications cannot be depended on, since they are due not only to the temperature to be tested, but to that at which the porcelain was originally baked. If made at a very high temperature, all the water will be driven off, and it will contract no further, whatever the heat to which it may be subsequently exposed. Other kinds of pyrometers have been used, but one of unquestionable excellence has not yet been invented.

PYRO'PHANE (*pur*, fire; and *phaino*, I make to appear: *Gr.*), a mineral which, in its natural state, is opaque, but by means of heat is rendered transparent.

PYROR'THITE (*pur*, fire: *Gr.;* and *orthite*), a scarce mineral, resembling *orthite* in appearance; but is very different in reality, for it burns in the flame of the blow-pipe like charcoal, whereas orthite melts.

PY'ROSCOPE (*pur*, fire; and *skopeo*, I examine: *Gr.*), an instrument for measuring the intensity of heat radiating from a fire.

PYRO'SIS (*purōsis*, from *puroō*, I burn: *Gr.*), a disease of the stomach, which causes a burning sensation, and the throwing up of a quantity of saline or sour fluid. It is a variety of *heartburn*, and is termed also *waterbrash*, and *blackwater*.

PYROS'MALITE (*pur*, fire; *osmē*, an odour; and *lithos*, a stone: *Gr.*), a Swedish mineral of a brown or greenish colour, occurring in six-sided prisms, of a lamellar structure. It is a native subchloride of iron; and, when heated, exhales the odour of chlorine.

PYROSO'MA (*pur*, fire; and *sōma*, a body: *Gr.*), the generic name of certain compound *ascidians*, animals allied to the mollusca. These ascidians form a hollow cylinder 10 to 12 inches long, which is only met with in the open ocean. The *Pyrosoma* is remarkable for the brilliant light which it emits.

PY'ROTARTARIC ACID, in Chemistry, is formed by subjecting crystallized tartaric acid to destructive distillation, or of cream of tartar. Its salts are termed pyrotartrates.

PY'ROTECHNY, or PYROTECH'NICS

(*pur*, fire; and *technê*, an art: *pur*, fire; and *technikos*, artistic: *Gr.*), the art of constructing fireworks intended to be let off on the ground, in the air, or under water. The materials principally employed consist of nitre, sulphur, and charcoal; with the addition of substances to produce colour, &c. Iron filings give bright red and white sparks. Copper filings impart a greenish tint to the flame: zinc, a fine blue; sulphuret of antimony, a less greenish blue, and much smoke; amber, colophony, or common salt, a yellow. Lamp-black, with gunpowder, gives a red, but with nitre in excess, a pink colour; and is used also to produce golden showers. Yellow sand, or glistening mica, communicate to fireworks a golden radiation; verdigris, sulphate of copper, and sal ammoniac, each a shade of green. Camphor gives a very white flame, and an aromatic odour. Some other substances are used to mask a bad smell. Lycopodium seed gives a rose-colour and splendid flame; it is used in theatres to represent lightning, &c.

PY'ROXENE, in Mineralogy, *augite*. According to some mineralogists, it is a general term under which augite, diallage, and hypersthene rank as varieties of the same species.

PYROXYL'IC SPIR'IT (*pur*, fire; and *xulon*, wood: *Gr.*), one of the products of the destructive distillation of wood. It is inflammable, burning with a blue flame, and may be used instead of alcohol in lamps, being often sold for the purpose, under the name of wood naphtha. When rectified, its spec. grav. is 0·804; it boils at 150°. [See METHYL.]

PYRRHO'NIANS, or PYRR'HONISTS, a sect of ancient philosophers, so called from Pyrrho, a native of Elis, in Peloponnesus, who flourished about 300 years B.C. Their opinions are known only through their enemies, and they are said to have been so sceptical as not to put even so much confidence in the senses as was necessary for the preservation of life. But this is refuted by their founder having lived to the age of ninety. They were believed to be always in search of truth without ever acknowledging that they had found it; hence the art of disputing upon all things, without ever going further than suspending our judgment, is called *pyrrhonism*.

PYTHAGORE'ANS, a sect of ancient philosophers, so called from being the followers of Pythagoras of Samos, who lived in the 6th or 7th century B.C. [See PHILOSOPHY.]——*Pythagorean system*, the system of astronomy taught by Pythagoras, which was founded on the hypothesis that the sun was a sphere situated in a centre, round which the planets revolved. This is now called the Copernican system, because it was revived by Copernicus. [See ASTRONOMY.]

PYTH'IA, or PYTH'ONESS, in Antiquity, the priestess of Apollo, who delivered oracular answers at Delphi in Greece.

PYTH'IAN GAMES, games celebrated in the neighbourhood of Delphi, at first every eighth, but afterwards at the end of every fourth year, in honour of Apollo, as the conqueror of the *Python*; which, according to the mythological history, was a dreadful dragon that sprang from the mud left by the flood of Deucalion. The contests were the same as those at Olympia.

PY'THON (*puthôn*, the serpent said to have been slain by Apollo: *Gr.*), a genus of large non-venomous snakes in which the hinder pair of limbs are developed under the skin, but not visible externally except that a terminal spur or nail projects at each side of the vent. One species grows to the length of 30 feet, and is capable of killing a buffalo. The Pythons are natives of the old world, and are allied to the boas of the new.

PYX (*puxis*, a box, especially of boxwood: *Gr.*), the box in which the consecrated wafer is kept by Roman Catholic priests.

Q

Q (*queue*, a tail: *Fr.*—because it is an O with a tail), the seventeenth letter of the English alphabet, is not to be found either in the Greek, old Latin, or Saxon alphabets; is never sounded alone, but in conjunction with *u*, and never ends any English word. For *qu* in English, the Dutch use *kw*, the Germans *qu*, and the Swedes and the Danes *qv*. It appears, in short, that *q* is precisely *k*, with this difference in use, that *q* is always followed by *u* in English, and *k* is not. The Romans used it for an abbrevation for Quintus, que, &c. Thus S. P. Q. R. *senatus populusque Romanus* (the senate and Roman people). And, as a numeral, for 500; but, with a dash over it, for 500,000. With us, Q is used as an abbreviation for *question;* also for quantity, or *quantum*, as *q. pl.*, *quantum placet* (as much as you please), and *q. s.*, *quantum sufficit* (as much as is necessary). Among mathematicians, Q. E. D. stands for *quod erat demonstrandum* (that which was to be demonstrated), and Q. E. F., *quod erat faciendum* (that which was to be done).

QUADRAGES'IMA (*quadragesimus*, the fortieth: *Lat.*), Lent; so called because it consists of forty days.

QUAD'RANGLE (*quadrangulum*: from *quatuor*, four; and *angulus*, an angle: *Lat.*), in Geometry, a figure consisting of four sides and four angles.——In Architecture, any range of houses or buildings with four sides in the form of a square.

QUAD'RANS (*Lat.*), the fourth of a Roman *As*, or three ounces, when the as was its full weight.——A farthing or fourth part of a penny. Before the reign of Edward I. the smallest coin was a sterling or penny, marked with a cross, by means of which it might be cut into halves and quarters. But, to avoid the frauds of unequal cuttings, that king coined halfpence and farthings in distinct round pieces.

QUAD'RANT (*quadrans*, a fourth part: *Lat.*), in Geometry, an arc of a circle, containing its fourth part, or ninety degrees; also, the space or area included between this arc and two radii drawn from the centre to each extremity.——QUADRANT, in Astronomy and Navigation, an instrument for taking the altitudes of the sun and stars; as also for taking angles in surveying heights, distances, &c. Quadrants are of different forms, but the most common is Hadley's, which consists of an octant, or the eighth part of a circle, an index, a speculum, two horizontal glasses, two screens, and two sight-vanes. Though its arc is only 45°, it measures angles of 90°, being constructed on the principle that 'when a ray of light is twice reflected, the angle made by its first and last directions is double that made by the mirrors.' [See OCTANT.]——There is also the *gunner's quadrant*, used for elevating and pointing cannon, mortars, &c.——QUADRANT OF ALTITUDE, a slip of brass, in length equal to a quadrant, graduated and attached to the artificial globe. It serves as a scale in measuring altitudes, azimuths, &c.

QUADRAN'TAL TRI'ANGLE (*quadrantalis*, containing the fourth part: *Lat.*), in Trigonometry, a spherical triangle, having for one of its sides an arc of 90°.

QUAD'RATE or QUAR'TILE (*quadrans*, a fourth part; *quartus*, the fourth: *Lat.*), in Astrology, an aspect of the heavenly bodies, in which they are distant from each other ninety degrees, or the quarter of a circle.

QUADRAT'IC EQUA'TIONS (*quadratus*, squared: *Lat.*), in Algebra, those in which the unknown quantity is found in the square or second power. If it is found only in the second power, the quadratic is *simple* or *pure:* if found *both* in the first and second powers, it is *complete* or *adfected:* $x^2 = a$, is a pure quadratic; $x^2 + x = b$, is a complete quadratic.

QUAD'RATRIX (*quadro*, I make square: *Lat.*), in Geometry, a mechanical line by means of which we can find right lines equal to the circumference of circles, or other curves, and their several parts.

QUAD'RATURE (*quadratura*, from *quadro*, I make square: *Lat.*), in Astronomy, the position of the moon, when she is 90° from the sun, or at one of the two points of her orbit, which are equidistant from conjunction and opposition.——In Geometry, the finding of a square equal in area to that of a curve. The *quadrature of the circle* is a very ancient and celebrated problem. As the area of a circle is equal to the product of the radius and half the circumference, it depends on the ratio of the diameter to the periphery. And as this ratio and its square are irrational numbers, the quadrature of the circle is not possible, except by the *geometrical* construction of a straight line equal to a circle of a given radius. The fraction $\frac{148}{167}$ gives a close approximation to the side of a square equal in area to a circle of which the diameter is unity. Only those who have an imperfect knowledge of geometry, at the present time, even attempt the *quadrature of the circle;* just as those only who have an imperfect knowledge of mechanics endeavour to find the *perpetual motion.*

QUADRIDEC'IMAL (*quatuor*, four; and *decem*, ten: *Lat.*), in Crystallography, an epithet for a crystal whose prism has four faces and two summits, containing together ten faces.

QUADRIDEN'TATE (*quatuor*, four; and *dens*, a tooth: *Lat.*), in Botany, an epithet denoting that there are four teeth on the edge.

QUAD'RIFID (*quadri-fidus*, split into four parts: *Lat.*), in Botany, an epithet designating anything cut into four segments.

QUADRI'GA (*Lat.:* from *quatuor*, four; and *jugum*, a yoke), in Antiquity, a car or chariot drawn by four horses. On the reverses of medals, we frequently see the emperor, or Victory, in a quadriga, holding the reins of the horses; whence these coins are, among numismatologists, called *nummi quadrigati* and *victoriati.*

QUADRIJU'GOUS (*quatuor*, four; and *jugum*, a pair: *Lat.*), in Botany, an epithet for a pinnate leaf with four pairs of leaflets.

QUADRILAT'ERAL (*quadrilaterus*, four-sided: *Lat.*), in Geometry, an epithet for a figure whose perimeter consists of four right lines, making four angles; it is called also quadrangular. Quadrilateral figures are either a parallelogram, trapezium, rectangle, square, rhombus, or rhomboid.

QUADRILL'E (*Fr.;* from *quadra*, a square: *Lat.*), a graceful kind of dance, consisting of parties of four. Also, a game of cards played by four persons with forty cards, the four tens, nines, and eights being discarded.

QUAD'RILOBATE (*quatuor*, four: *Lat.;* and *lobos*, a lobe: *Gr.*), in Botany, an epithet for a leaf having four lobes, or divided to the middle into four distinct parts with convex margins.

QUADRILOC'ULAR (*quatuor*, four; and *loculus*, a compartment: *Lat.*), in Botany, having four cells, as a *quadrilocular* pericarp.

QUADRINO'MIAL (*quatuor*, four; and *nomen*, a name: *Lat.*), in Algebra, a root which consists of four terms or parts.

QUADRIPH'YLLOUS (*quatuor*, four; *Lat.;* and *phullon*, a leaf: *Gr.*), in Botany, having four leaves.

QUADRIRE'MIS or QUAD'RIREME (*quadriremis: Lat.*), a species of the *navis longa*, or ship of war, used by the Romans and also by the Greeks; being a galley with four benches or banks of rowers.

QUADROON', the name given by the South Americans to the offspring of a mulatto woman by a white man.

QUAD'RUMANA (*quadrumanus*, four-handed: *Lat.*), an order of mammals established by Cuvier for the reception of the apes, baboons, monkeys, and lemurs, animals whose hind limbs are better suited for prehension than walking, the first toe being opposable to the others as the thumb is to the fingers. They are vegetable feeders, and chiefly dwell on trees, some of them being aided in their progress from branch to branch by their prehensile tails. They are natives of warm climates. Some species approach man in their structure. [See PRIMATES, APE, BABOON, MONKEY.] As to the geographical distribution of the quadrumana, it is remarkable that Australia and New Guinea do not contain a single species, whilst in Madagascar only the lemurs, the most lowly organized of all, are to be found. The gibbons are confined to south-eastern Asia, and the dog-faced baboons to Africa. In America every monkey has three premolar teeth (false molars), whilst in the rest of the world not a single monkey has more than two. Only one species has established itself in Europe, and that is the North African *Innuus sylvanus*, which has found a home on the rock of Gibraltar.

QUAD'RUPED (*quadrupes*, fourfooted: *Lat.*), any animal having four feet, as a horse, a lion, a dog, &c.

QUAD'RUPLE (*quadruplus*, fourfold: *Lat.*), an epithet for whatever is fourfold, or four times any given quantity.

QUÆ'RE (endeavour to obtain information: *Lat.*), a term expressive of doubt, and calling for further inquiry.

QUÆS'TOR (*Lat.*, from *quæro*, I search for), an officer among the Romans originally found in two departments. In one, the quæstor performed, to some extent, the duties of a public prosecutor; in the other, he had charge of the revenues. The *quæstorship* was the first office any person could fill in the commonwealth.

QUAG'MIRE (i.e. quakemire), soft wet land, the surface of which is firm enough to bear a person, but which shakes or yields under the feet.

QUAIL (*caille: Fr.*), the name given to birds of the genus *Coturnix*, allied to the partridge. The common quail (*C. dactylisonans*), a smaller bird than the partridge and less prolific, comes to us in May and leaves again in October for the north of Africa. In performing their migrations quails arrive at Malta so exhausted by fatigue, and in such prodigious multitudes, that the inhabitants pick them up with facility and in the greatest abundance. After resting one night, those that escape being taken proceed to Syria and Arabia, and spread over Asia and Africa. Quails were formerly much prized for their pugnacious propensities: quail-fighting was as common at Athens and Rome as cock-fighting has been in modern times, and it is still practised in some parts of Italy. In the east also, and especially in China, quails are pitted against each other, after having been armed with artificial spurs.

QUA'KERS or FRIENDS, a religious sect which made its first appearance in England during the protectorate of Cromwell. Their founder was George Fox, a native of Drayton in Leicestershire. He proposed but few articles of faith, insisting chiefly on moral virtue, mutual charity, the love of God, and a deep attention to the inward motions and secret operations of the Spirit. He required a plain simple worship, and a religion without ceremonies, making it a principal point to wait in profound silence the directions of the Holy Spirit. Although at first the Quakers were guilty of some extravagances, these wore off, and they settled into a regular body, professing great austerity of behaviour, a singular probity and uprightness in their dealings, a great frugality at their tables, and a remarkable plainness and simplicity in their dress. They were subjected for a long time to constant persecution; and their refusal to take oaths or pay tithes was a source of great suffering to them. But, since the time of William III., their affirmation has been received instead of an oath; and an alteration in the mode of levying tithes has satisfied their scruples on that point. Their system or tenets are laid down by Robert Barclay, one of their members, in a sensible, well-written 'Apology,' addressed to Charles II. Their principal doctrines are —that God has given to all men, without exception, supernatural light, which being obeyed can save them; and that this light is Christ, the true light, which lighteth every man that cometh into the world: that the scriptures were indeed given by inspiration, and are preferable to all the other writings in the world; but that they are no more than secondary rules of faith and practice, in subordination to the light or Spirit of God, which is the primary rule: that immediate revelation has not ceased, a measure of the spirit being given to every one: that all religious ceremonies of mere human institution ought to be laid aside: that, in civil society, the saluting one another by pulling off the hat, bending the body, or other humiliating posture, should be abolished: and that the use of the singular pronoun *thou* when addressing one person, instead of the customary *you*, should be strictly adhered to. They further laid it down as a solemn obligation, not to take an oath, encourage war, engage in private contests, nor even carry weapons of defence. On a most vital question of Christian faith, one of their body has lately thus written: 'Although "Friends" do not call the Holy Scriptures the Word of God, but apply this epithet exclusively to the Lord Jesus Christ, yet they believe that these sacred writings are the *words* of God, written by holy men as they were moved by the Holy Ghost; that they are profitable for doctrine, for reproof, for correction, for instruction in righteousness, that the man of God may be perfect, thoroughly furnished unto all good works; and that they are able to make wise unto salvation through faith which is in Christ Jesus. They also hold them to be the most perfect and authentic declaration of Christian faith, and the only fit outward standard in all religious controversies: and that whatever, either in doctrine or practice, any profess or do, though under pretence of the guidance of the Holy Spirit, if it be contrary to or inconsistent with the testimony of the Holy Scriptures, is to be esteemed a delusion and error.'—The society is governed by its own code of discipline, which is enacted and supported by meetings of four degrees, for discipline; namely, preparative, monthly, quarterly, and yearly meetings. The preparative digest and prepare the business for the monthly meetings, in which the executive power is principally lodged, subject however to the revision and control of the quarterly meetings, which are subordinate and accountable to the yearly meeting; and subject to its supervision and direction. Its authority is paramount, and it possesses the sole power to make or amend the discipline. There are at present ten yearly meetings, namely, London, Dublin, New England, New York, Philadelphia, Baltimore, Virginia, North Carolina, Ohio, and Indiana, which include a total of about 150,000 members; but their numbers are supposed to be decreasing. In this country they are most numerous in Yorkshire, Lancashire, Durham, Cumberland, and Essex.

QUALIFICA'TION (*qualis*, having a certain quality: and *facio*, I make: *Lat.*), any natural endowment, or any acquirement, which fits a person for a place, office, or employment. Also any property or possession which gives one a right to exercise the elective franchise, or furnishes one with any legal power or capacity.

QUAL'ITY (*qualitas: Lat.*), in Physics, some property of bodies. *Essential Quality*, some property which is necessary to constitute a thing what it is. *Sensible Quality*, one that affects the senses, such as figure, taste, &c.

QUAN'TITY (*quantitas: Lat.*), in Grammar, the measure of a syllable, or that which determines the time in which it is pronounced.——In Mathematics, anything which can be multiplied, divided, and measured.——In Physics, anything capable of estimation or measurement, which being compared with another thing of the same nature, may be said to be greater or less than, equal or unequal to it.——In common usage, *quantity* is a mass or collection of matter of indeterminate dimensions: thus we say, a *quantity* of earth, a *quantity* of timber, &c. But when we speak of an assemblage of individuals or separate beings, we say a *number*: as a *number* of men, of horses, &c.

QUAN'TUM (*Lat.*), as much as. Thus *Quantum meruit* (as much as he deserved), in Law, an action grounded on a promise that the defendant should pay to the plaintiff for his service as much as he should deserve.——*Quantum sufficit* (as much as is sufficient), a very common expression.——*Quantum valebat* (as much as it was worth), in Law, an action to recover of the defendant for goods sold, as much as they were worth.

QUAQUAVER'SAL (*quaqua versum*, every way: *Lat.*), a term applied by geologists to strata which dip to every point of the compass, like those surrounding a volcano.

QUAR'ANTINE (*quaranta*, forty: *Ital.*), the restraint of intercourse, to which a ship arriving in port is subjected, on the presumption that she may be infected with a malignant contagious disease. This is either for forty days, or for any other limited term, according to circumstances. A ship thus situated is said to be *performing quarantine*. The term has been adopted, because it was generally supposed that if no infectious disease break out within forty days, or six weeks, no danger need be apprehended from the free admission of the individuals under quarantine. During this period all the goods, clothes, &c., that might be supposed capable of retaining the infection, are subjected to a process of purification, which is a most important part of the quarantine system.——In Law, the period of forty days, during which the widow of a man dying possessed of land, has the privilege of remaining in the principal messuage or mansion house.

QUA'RE IM'PEDIT (why does he hinder: *Lat.*), in Law, a writ lying for one who has a right of advowson, against one who hinders or disturbs him in his right to present a clerk when the living is vacant

QUAR'RY (*carrig*, a stone: *Irish*), a pit where stones for building, &c., are dug from the earth; as a freestone quarry, or a marble quarry.——QUARRY (*quérir*, to fetch *Fr.*), in Falconry, the game which a hawk is pursuing, or has killed.——Among hunters, a part of the entrails of the beast taken given to the hounds.

QUAR'TAN (*quartanus*, from *quartus*, the fourth: *Lat.*), in Medicine, an intermitting ague, that occurs every fourth day.

QUARTA'TION (*quarta*, the fourth part: *Lat.*), in Chemistry, the operation by which the quantity of one constituent is made equal to the fourth part of the whole mass. It is specially applied to the act of rendering the quantity of silver, in a combination consisting of silver and gold, one fourth of the entire that the silver may be soluble in nitric acid. If the gold exceeds this proportion, it protects the silver, and thus prevents the separation of the two metals by the solution of one of them.

QUAR'TER (same *deriv.*), the fourth part of anything, the fractional notation for which is ¼.——QUARTER, in Astronomy, the fourth part of the moon's period, or monthly revolution. Thus, from the new moon to the quadrature is the first quarter; from this to full moon, the second quarter, &c. ——QUARTER, in Naval Architecture, that part of a ship's hull which lies from the steerage to the transom.——ON THE QUARTER indicates the bearing or position of an object seen between aft and abeam.——QUARTER, in Weights, is generally used for the fourth part of a hundred-weight avoirdupois, or 28lb.——QUARTER also signifies the sparing of men's lives in battle when they are no longer able to defend themselves.——QUARTER-DECK, that part of the deck of a ship which extends from the stern to the mainmast.——QUARTER-GALLERY, a sort of balcony on the quarters of a ship. ——QUARTER-MASTER, in the army, an officer whose business is to attend to the quarters of the soldiers, their provisions, &c. In the navy, an officer who assists the mates in their duties, attending the steerage, &c.——QUARTER-MASTER-GENERAL, a military officer, whose duty is to mark the marches and encampments of an army, and procure supplies of provisions, forage, &c. ——On ship-board, QUARTERS signifies the stations or places where the officers and men are posted in action.——QUARTERS, in War, is used in various senses: thus to indicate the place allotted to a body of troops to encamp upon, &c.——HEAD-QUARTERS, the place where the general of an army resides, which is generally near the centre of the army.——WINTER-QUARTERS, the places in which the troops are lodged during the winter, or their residence in those places.

QUAR'TER DAYS, the days which begin the four quarters of the year, and on which rents, &c., usually become due in this country, namely, the 25th of March, or Lady-day; the 24th of June, or Midsummer-day; the 29th of September, or Michaelmas-day; and the 25th of December, or Christmas-day.

QUAR'TERING, in Heraldry, partitions of the escutcheon according to the number of coats that are borne in it, or the several divisions that are made when the arms of more than one family are borne by the same person.

QUAR'TER SES'SIONS, a court of justice, held quarterly, before magistrates of a county or borough, to try minor offences by jury, after bills found by a grand jury. The legal powers of these are often very great; but the questions may, in many cases, be removed to superior courts. Two justices at least must be present.

QUARTETT' (*quartetto: Ital.*), in Music, a piece for four voices or four instruments.

QUAR'TO (*quartus*, the fourth: *Lat.*), in Printing, &c., a size of books, produced by twice folding a sheet, which then makes four leaves. Also a book so folded.

QUARTZ (*Ger.*), in Mineralogy, a species of silicious stone of various colours, commonly amorphous, and frequently crystallized. The name is usually applied, in scientific language, to the purer varieties of silica, particularly to *rock crystal*. Quartz is abundantly spread throughout the globe. Its varieties are numerous: differences of colour being produced by different metals. Thus, *amethyst*, or purple quartz, is tinged with a little iron and manganese. *Rose quartz*, or false ruby, derives its colour from manganese. *Aventurine* is a beautiful variety of quartz, of a rich brown colour, which, from a peculiarity of texture, appears filled with bright spangles. Small crystals of quartz, tinged with iron, are found in Spain, and have been termed hyacinths of Compostella. Flint, chalcedony, carnelian, onyx, sardonyx, and bloodstone, or heliotrope, and the numerous varieties of agates, are principally composed of quartz, with various materials from which they derive their particular hue.

QUAS, a liquor commonly drunk in Russia. It is prepared from pollard, meal, and bread, or from meal and malt, by an acid fermentation.

QUASH'ING (*casser*, to crush: *Fr.*), in Law, the overthrowing and annulling of anything.

QUA'SI CON'TRACT, in the Civil Law, an act which has not the strict form of a contract, but yet has the force of one. Thus, if one person does another's business in his absence without his procuration, and it has succeeded to the other person's advantage, the one might have an action for what he has disbursed, and the other to obtain an account of the administration: which amounts to a *quasi-contract*.

QUAS'SIA, in Botany, a genus of tropical plants: nat. ord. *Simarubaceæ*. The wood of the root of the *Quassia* tree is intensely bitter, and a decoction from it is used in medicine. Brewers have been often charged with using it as a substitute for hops, but this is now prohibited under severe penalties. A strong infusion of quassia, sweetened with brown sugar, is a safe and effective poison for flies. The plant yields an alkaloid called *quassine*, which crystallises in small white prisms.

QUATREFOIL (*quatre*, four; and *feuille*, a leaf: *Fr.*), in Heraldry, a four-leaved plant, a frequent bearing in coat armour.

QUA'VER, in Music, a measure of time equal to half a crochet, or an eighth of a semibreve. Also a shake or rapid vibration of the voice.

QUEEN (*cwen*, a wife: *Ang. Sax.*), a woman who holds a crown singly; or, by courtesy, one who is married to a king. The former is distinguished by the title of *queen regnant;* the latter by that of *queen consort*. A queen consort is a subject; though as the wife of the king she enjoys certain prerogatives. The widow of a king is called *queen dowager*.

QUEEN ANNE'S BOUNTY, funds vested in Trustees called Governors, arising from the first year's income (according to the valuation in the King's books), of newly appointed incumbents in the Church of England, and one tenth of that sum annually paid by them afterwards. These funds are applied to the augmentation of small livings. The first fruits were formerly paid to the Crown, until Queen Anne ordered them to be applied in the manner stated.

QUERCIT'RON, the bark of the *Quercus tinctoria*, or yellow oak, a tree growing in North America. It is used in dyeing yellow, the colour being developed from it by a solution of alum.

QUER'CUS (*Lat.*), in Botany, a genus of amentaceous trees. [See OAK and CORK.]

QUES'TIO (*Lat.;* from *quæro*, I inquire), in Logic, the third proposition in a syllogism, which contains the question to be proved.

QUES'TION (*quæstio*, from *quæro*, I seek: *Lat.*), the application of torture to prisoners under criminal accusation. It was customary in France before the revolution. One kind was intended to make him confess his own guilt: the other to make him confess his accomplices. From the earliest times it was perceived that disclosures made under the influence of torture could not be relied on; yet the practice was very prevalent, wherever the principles of the Civil Law have been adopted. The rack is the only instrument of torture which was employed in England. It was introduced, or at least first commonly used in the minority of Henry VI. The *peine forte et dine*, however, was recognized by the law: and its cruel details were diffused in the reign of Henry IV. The prisoner who refused to plead was laid on the ground in a dark room; as many weights as he could bear, *and more*, were laid on him; and no sustenance being allowed but a morsel of the worst bread, and a draught of the worst water, on alternate days, he was to so remain, until he pleaded or died. This torture was inflicted until the beginning of the last century; and until so lately as the commencement of the reign of George III., prisoners were forced to plead, by squeezing their thumbs and other cruelties. In the reign of George III. it was enacted that any one who stood mute, or did not answer directly to the arraignment should be held to plead guilty.

QUEST'MEN (*queste*, a search: *Fr.*), in Law, persons chosen to inquire into abuses and misdemeanours, especially such as relate to weights and measures.

QUES'TUS (*quæstus*, an acquiring: *Lat.*), in Law, land which does not descend by hereditary right, but is acquired by one's own labour and industry.

QUICK-LIME, any calcareous substance deprived of its carbonic acid: as chalk, limestone, oyster-shells, &c., calcined.

QUICK-MATCH, a combustible preparation used by artillerymen; being formed of cotton strands dipped in a boiling composition of vinegar, saltpetre, and mealed powder.

QUICK'SILVER. [See MERCURY.]

QUID PRO QUO (one thing for another: *Lat.*), an equivalent, or the mutual consideration and reciprocal performance of both parties to a contract.

QUI'ETISTS, in Ecclesiastical History, a sect of mystics, originated by Molinos, a Spanish priest, who maintained that religion consists in the internal rest and meditation of the mind, wholly employed in contemplating God and submitting to his will. This doctrine was termed *Quietism*: and was held by a number of persons in France, the most celebrated of whom were Madame de la Motte Guiyons, and Fénélon. The writings of the latter on the subject were condemned by Innocent XII.; and he acquiesced without a murmur in their condemnation. Quietists existed in early times among the monks of Mount Athos; the sect being called *Hesychastæ* (from *hēsuchia*, repose: *Gr.*).

QUINCE, the fruit of the *Cidonia vulgaris*, so named from Cydon, a town of Crete, famous for abounding with this fruit. It is now cultivated throughout Europe, and when boiled and eaten with sugar, or made into marmalade, is much esteemed.

QUIN'CUNX (*Lat.*), the dispositions of any five objects, so that four of them shall be at the corners, and one in the middle of an imaginary square.——In Gardening, the disposition of trees, in this order; which may be repeated, so as to form a regular grove or wood, that presents equal rows and parallel alleys. Sir Thomas Browne wrote a curious treatise, 'The Garden of Cyrus, or the Quincuncial Lozenge,' in which he points out how frequently the number five occurs in nature: 'quincunxes,' says Coleridge, 'in heaven above, quincunxes in earth below, quincunxes in the mind of man, quincunxes in tones, in optic nerves, in roots of trees, in leaves, in everything.'

QUINDEC'AGON (*quindecim*, fifteen: *Lat.*; and *gōnia*, an angle: *Gr.*), in Geometry, a plain figure with fifteen sides and fifteen angles.

QUINDECEM'VIR, or QUINDECEM'VIRI (fifteen men: *Lat.*), in Roman Antiquity, a college of fifteen priests: originally but ten, five chosen from the patricians, and five from the Plebeians; Julius Cæsar increased their number to sixteen. They were the interpreters of the Sibylline books, which, however, they never consulted without an express order of the Senate; and it was their duty also to celebrate the games of Apollo, whose priests, indeed, they were considered to be.

QUINI'NE, an alkaloid of inestimable value in the form of a sulphate, as a tonic, and febrifuge. It is extracted from the bark of several species of small trees belonging to the genus *Cinchona*, which grow in Peru and Ecuador, and named in honour of the Countess of Chinchona, wife of a viceroy of Peru, who was cured of a fever by the use of the bark, and who introduced it into Europe. For many years the medicine was taken in the form of powdered bark, which being sent to Europe by the South American Jesuits, was commonly known as Jesuits' bark, or Peruvian bark The tree was called *Quina-quina*, or bark of barks, by the Indians, by whom its virtues were communicated to the Spaniards. Vast numbers of trees having been improvidently destroyed during a long series of years, the medicine grew gradually dearer, and it became highly desirable that the plant should be cultivated in other parts of the world. Mr. Markham has lately succeeded in obtaining a quantity of seeds and young trees, in spite of the opposition of the Peruvians, and they have been planted in India, where the young trees thrive so well that no fear of the supply of quinine failing need now be entertained. Thirty-nine species of cinchona have been described, but only a few of these are considered deserving of cultivation. No fewer than four alkaloids having more or less similar qualities have been obtained from Peruvian bark, the best known of these being quinine, which was first discovered by two French chemists, Pelletier and Gaventon, in 1820. It is in these alkaloids that the medicinal virtues of the bark reside. To show the great consumption of quinine, notwithstanding its high price, it may be mentioned that the Indian government has sometimes expended upwards of 50,000*l.* in a single year in the purchase of this drug.

QUINQUAGES'IMA (*quinquagesimus*, the fiftieth: *Lat.*), the seventh Sunday, and therefore about the fiftieth day before Easter, whence its name.

QUINQUENNA'LIA (*Lat.*, from *quinquennium*, a period of five years), in Antiquity, Roman games, celebrated every five years. They were instituted by the Emperors in commemoration of different events in their respective reigns.

QUIN'QUEREME (*quinqueremis*, having five banks of oars: *Lat.*), in Antiquity, a galley having five seats or rows of oars. When Regulus was sent to Africa, A.U.C. 498, the Romans had 330 of these vessels, and the Carthaginians 350, each furnished with 300 rowers and 120 soldiers, which would give 140,000 men for those of the Romans, and 150,000 for those of the Carthaginians; numbers that would be incredible did they not rest on the highest authority.

QUIN'SEY, or QUIN'SY (*esquinancie: Fr.*), in Medicine, inflammation of the tonsils, the common inflammatory sore throat; it is not infectious. It has proved fatal, by causing suffocation, but it generally terminates by suppuration.

QUINTES'SENCE, a term used by the older chemists to express alcoholic tinctures; made by digestion, at common temperatures, or by the sun's heat.——In a more general sense, an extract of anything containing the most essential part.

QUIN'TILE (*quintus*, the fifth: *Lat.*), in Astronomy, the aspect of planets when distant from each other the fifth part of the zodiac, or 72 degrees.

QUIN'TILIS (*Lat.*), in Chronology, the month of July; so called because it was the fifth month of Romulus's year, which began in March. It received the name of July from Marc Antony, in honour of Julius Cæsar, who reformed the calendar.

QUIN'TIN (*quintaine: Fr.*), in ancient martial sports, an upright post on the top of which turned a cross piece, on one end of which was fixed a broad board, and on the other a sand-bag. The play was to tilt or ride against the broad end with a lance, and pass without being struck by the sand-bag behind.

QUIRINA'LIA, in Antiquity, a feast celebrated among the Romans in honour of Romulus, who was called *Quirinus*. It was held on the 17th of February.

QUIRI'TES, in Antiquity, a name given to the citizens of Rome, as distinguished from the soldiery. It is said to have originated in their having admitted into their city the Sabines, who, inhabiting the town of Cures, were called *Quirites;* and the appellation was thenceforward given to both nations indiscriminately.

QUI-TAM (who as well: *Lat.*), in Law, a term for an action brought, or information exhibited, at the suit of the king, on a penal statute, in which half the penalty is directed to fall to the suer or informer. The plaintiff describes himself as A. B., 'qui tam pro domino rege quam pro seipso (who sues as well for the king as himself).'

QUIT'RENT (*quietus redditus*, quiet rent: *Lat.*), in Law, a small rent payable by the tenants of most manors, and by which they are freed from all other services.

QUIT'TER-BONE, in Farriery, a hard round swelling on the coronet, between the heel and the quarter, usually on the inside of the foot.

QUOAD HOC (*Lat.*), a term used frequently in law reports to signify that 'as to the thing named,' the law is so, &c.

QUODLIBET (what you please: *Lat.*), in the language of the schoolmen, a term applied to questions which were miscellaneous ——In French, a jeu d'esprit, a pun, &c.

QUOIN, or COIN (*coin: Fr.*), in Architecture, the external or internal corner of any building or any part of a building.——In Artillery, a loose wedge of wood, placed under the breech of a cannon to adjust its elevation.

QUOITS (*coete*, thrown: *Belg.*), a kind of exercise or game very similar to the one known among the ancients under the name of *discus*. It consists in pitching or throwing a flat iron ring at a fixed object.

QUO'RUM, in Law, a word frequently mentioned in our statutes, and in commissions both of justices of the peace and others. By it is generally understood that among the number of justices necessary for the transaction of business, certain individuals must necessarily be present, otherwise the business cannot proceed. The term is derived from the words of the commission, *quorum* A. B. *unum esse volumus* (of whom we will that A. B. be one: *Lat.*). For example, where a commission is directed to seven persons, or to any three of them, whereof A. B. and C. D. are to be two, these are said to be of the *quorum*, because the rest cannot proceed without them.

QUO'TA (*quot*, how many: *Lat.*), the part which each member of a society is bound to contribute, or is to receive, in making up or dividing anything.

QUOTID'IAN (*quotidianus*, daily: *Lat.*), in Medicine, an intermitting fever, or ague, of which the paroxysm or fit returns every day.

QUO'TIENT (*quoties*, how often: *Lat.*), in Arithmetic, the number which arises, by dividing the dividend by the divisor; or, in other words, the number resulting from the division of one number by another.

QUO-WARRAN'TO (by what authority: *Lat.*), in Law, a writ filed in the Court of King's Bench, by the Attorney-General, or some one in his name, calling upon a person to show by what title he holds an office, franchise, &c. The proceedings under this writ were attended with so many difficulties, that it has been superseded by what is termed, an information in the *nature of a quo warranto*, in which the person usurping is considered in the nature of an offender, and consequently punishable by fine.

R

R, the eighteenth letter of our alphabet, is numbered among the liquids and semi-vowels, and is sometimes called the *canine* letter. Its sound is formed by a guttural extrusion of the breath, which in some words is through the mouth, with a sort of quivering motion or slight jar of the tongue. In words which we have received from the Greek language we follow the Latins, who wrote *h* after *r*, as the representative of the aspirated sound with which this letter was pronounced by the Greeks; as in *rhapsody*, *rhetoric*, &c.; otherwise it is always followed by a vowel at the beginning of words and syllables. As an abbreviation, R was used by the Romans for Roma; as, R. C., *Romana Civitas* (the Roman State). For Rei; as, R. G. C., *Rei Gerendæ Causa* (for the sake of carrying on the affairs). For Recte; as, R. F. E. D., *Recte Factum et Dictum* (rightly done and spoken). For Res, or Romani; as, R. P., *Respublica* (the republic), or *Romani Principes* (the Roman Chiefs). ——In English, it stands for Rex, as, G. R., *Georgius Rex* (King George). And for Regina; as, V. R., *Victoria Regina* (Queen Victoria). In Medicinal Prescriptions it is put for *recipe* (take). And, as a numeral, for 80, and with a dash over it, for 80,000.

RAB'BET (*rabattre*, to pare down: *Fr.*), in Carpentry, a deep groove or channel cut in a piece of timber longitudinally, to receive the edge of a plank, or the ends of several planks, that are to be fastened in it.——*Rabbeting*, the paring down the edge, or cutting channels or grooves in boards, for the purpose of lapping one over the other. In Ship-carpentry, it signifies the letting in of the planks of the ship into the keel.

RAB'BI, or RAB'BIN (*rebee*, master: *Heb.*), a title assumed by the Pharisees and Doctors of the law among the Jews. There were several gradations before they arrived at the dignity of a rabbin; but it does not appear that there was any fixed age or previous examination necessary; when, however, a man had distinguished himself by his skill in the written and oral law, and passed through the subordinate degrees, he was saluted a rabbin by the public voice. In their schools the rabbins sat upon raised chairs, and their scholars at their feet: thus St. Paul is said to have studied at the feet of Gamaliel. Such of the doctors as studied the letter or text of scripture were called *Caraites*, those who studied the cabballa, *Cabbalists*; and those whose study was in the traditions or oral law, were called *Rabbinists*. The customary duty of the *Rabbins*, in general, was to pray, preach, and interpret the law in the synagogues. Among the modern Jews, the learned men retain no other title than that of *Rabbi*; they have great respect paid them, have the first places or seats in their synagogues; determine all matters of controversy; and frequently pronounce upon civil affairs.

RAB'BIT, in Zoology, the *Lepus cuniculus*, a well-known rodent animal, which feeds on grass or other herbage and grain, and burrows in the earth. It is very prolific, and is kept in warrens for the sake of its flesh.

RAB'DOMANCY, or RHAB'DOMANCY (*rhabdos*, a rod; and *manteia*, prophecy: *Gr.*), in Antiquity, a sort of divination by means of rods. The divining rod is the branch of a tree, generally hazel, forked at one end, and held in a particular way by the two ends. It is supposed to indicate the presence of the substance sought, by bending towards it with a slow rotatory motion; the diviner being, in modern times, in contact with some metallic or magnetic substance. It is used by the credulous, most usually, for the discovery of metals and water.

RACCOON', an American plantigrade carnivorous animal belonging to the bear family. It is the *Procyon lotor* of zoologists. It is somewhat of the shape of a beaver, with hair like that of a fox; its head, too, resembles the fox, except that the ears are shorter, roundish, and naked; its tail is longer than its body, and not unlike that of a cat, with annular streaks of different colours. It lodges in a hollow tree; its fur is valuable.

RACE (*race*: *Fr.*, from *radix*, a root: *Lat.*), the lineage of a family, or the series of descendants indefinitely continued.

RACEME' (*racemus*, a bunch of grapes: *Lat.*), in Botany, a species of inflorescence, consisting of a peduncle with short lateral branches. It may be either simple or compound, naked or leafy, &c.——*Racemous*, growing in clusters. *Racemiferous*, bearing racemes or clusters; as, the racemiferous fig-tree.

RACES (*ræs*, to run: *Sax.*), a public trial of speed, in horses. Among the ancients, horse-races were performed either by single horses, or by two horses, on one of which they performed the race, and leaped upon the other at the goal. Chariot-races were performed by one, two, three, four, five, or more horses joined together in chariots. How great soever the number of horses might be, they were all ranged abreast, or in one front, being coupled together in pairs. Clisthenes, the Sicyonian, introduced the custom of coupling the two middle horses only; the rest he governed by reins. The principal part of a charioteer's skill consisted in dexterously avoiding the *metæ*, or goals; a failure in this point overturned his chariot, which was an event that was attended not only with imminent danger, but also with great disgrace. Nero, at the Olympic games, made use of a *decemjugis*, or chariot drawn by ten horses. He also used camels in the Roman circus; and Heliogabalus introduced elephants instead of horses. The most remarkable circumstance relating to the Roman chariot-races was the factions of the charioteers, which divided into parties the whole city of Rome. In modern times, at Rome, the race-horses have no riders; they run through the *Corso*, a street of considerable length, which derives its name from being thus used. The spectators range themselves at each side. Contrivances which goad the horses are attached to them. Races were customary in England in very early times, and are mentioned by Fitz-Stephen in the reign of Henry II. In queen Elizabeth's reign they appear to have been carried to such excess as to have injured the fortunes of the nobility. At that time, however, the matches were private, and gentlemen rode their own horses. In the reign of James I. public races were established; but it was not till after the restoration of Charles II. that they were particularly encouraged by royalty; when 'his majesty's plate,' a cup or bowl worth 100 guineas was first given, in lieu of which that sum of money is now paid. The usual trial of speed, in English racing, is a single mile; of continuance or bottom, four miles; but the true test of thorough blood in a racer is continuance. There is a great deal of fraud practised in the whole business of racing; and, as in every other species of gambling, the wealthy who addict themselves to the sport generally in the end become the victims of a host of black-legs and their confederate jockies.

RACHI'TIS (*rachitis*, a spinal complaint: *Gr.*), in Medicine, the rickets, which see.

RACK (*rakke;* from *rekken*, to extend: *Belg.*), a horrid engine of torture, furnished with pullies and cords, &c. for extorting confession from criminals or suspected persons. Its use is entirely unknown in free countries.

RACK'ET (*raquette: Fr.*), a bat to strike the ball with at tennis. It usually consists of a net-work of catgut strained very tight in a circle of wood, with a handle.

RA'DIAL (*radius*, the exterior bone of the fore arm: *Lat.*), in Anatomy, pertaining to the *radius* or fore-arm of the human body; as, the *radial* artery or nerve. The *radial muscles* are two muscles of the fore-arm, one of which bends the wrist, the other extends it.——*Radial Curves*, in Geometry, curves of the spiral kind, whose ordinates all terminate in the centre of the including circle, and appear like so many semi-diameters.

RA'DIANT HEAT (*radio*, I emit beams: *Lat.*). Rays of heat are emitted in all directions, from a body whose temperature is higher than that of the airs, and bodies which surround it. These rays are either reflected, absorbed, or transmitted. *Reflection* of heat may be illustrated by throwing the heat from a fire on the face by means of a piece of bright tinned iron. *Absorption* of heat may be shown by roughening the surface of the tins; when it will become hot and scarcely any heat will be reflected. *Transmission* of heat is exhibited by the atmosphere, which allows the sun's rays to pass through it, without having its temperature raised by them, the heat it receives being due to reflection from and contact with the heated surface of the earth; and glass will not intercept solar heat, but it will intercept heat emanating from a body at a comparatively low temperature: thus from hot water, or even from a common fire. And the lower the temperature of the heated body the less of its heat will be transmitted by the glass.

RADIA'TA (*radius*, a ray: *Lat.*), in Zoology, a division of the animal kingdom, containing several classes [ACALEPHA, ECHINODERMATA, ZOOPHYTES, INFUSORIA], in all of which the species are characterized by a radiating form of body, or of some portion of it; for example, a star-fish, a sea anemone, and a medusa.

RA'DIATE, or RA'DIATED, in Botany, a term applied to such flowers as have several semi-floscules set round a disk, in form of a star: those which have no such rays are called *discous* flowers.

RADIA'TION (*radiatio: Lat.*), the act of a body emitting or diffusing rays of light, &c., all round, as from a centre.——*Radiating point*, in Optics, any point of an object from whence rays proceed.

RAD'ICAL (*Fr.;* from *radix*, a root: *Lat.*), in Chemistry, radicals are either simple or compound. *Simple* radicals consist of but one elementary substance; thus sulphur, the radical of sulphuric acid, is simple. A *compound* radical consists of two or more elementary substances combined, the combination simulating the deportment and exercising the functions of an elementary substance; thus cyanogen, the radical of hydrocyanic or prussic acid, is compound, consisting of carbon and nitrogen. Chemists speak of several theoretical compound radicals, such as ethyl, consisting of four equivalents of carbon and five of hydrogen. This is assumed to exist in alcohol and ether.——In Grammar, the appellation *radical* is given to primitive words, in contradistinction to compounds and derivatives.——*Radical quantities*, in Algebra, those whose roots may be accurately expressed in numbers.

RAD'ICAL SIGN, in Algebra, $\surd$, the symbol which denotes that a root is to be extracted: it is $\surd$, a modification of the letter ℞. Thus $\sqrt{a}$ means the square root of a; $\sqrt[3]{d}$, the cube root of d; $\sqrt[8]{16}$, the eighth root of 16. Fractional exponents are often used instead of the radical sign; thus $a^{\frac{1}{2}}$, instead of $\sqrt{a}$; $d^{\frac{1}{3}}$ instead of $\sqrt[3]{d}$; $16^{\frac{1}{8}}$, instead of $\sqrt[8]{16}$. A radical sign and an exponent may be used together: thus $\sqrt[5]{a^2}$, or $a^{\frac{2}{5}}$, the fifth root of *a* square.

RADICA'TION (*radix*, a root: *Lat.*), in Botany, the disposition of a root of a plant, with respect to the ascending and descending caudex, and the radicles.

RAD'ICLE (*radicula*, a small root: *Lat.*), in Botany, that part of the seed of a plant which, upon vegetating, becomes the root.

RA'DIUS (*Lat.*), in Geometry, a right line extending from the centre of a circle to the periphery; and hence the semidiameter of the circle.——In Trigonometry, the *radius* is the sine of 90 degrees.——In Anatomy, the exterior bone of the fore-arm, descending along with the ulna from the elbow to the wrist. It is so called from its supposed resemblance to the spoke of a wheel.——In Botany, the outer part or circumference of a compound radiate flower, or radiated discous flower.

RA'DIUS-VEC'TOR (*radius*, a radius; and *vector*, a carrier: *Lat.*), in Astronomy, a straight line drawn from the centre of force to the point of the orbit where the body is supposed to be. When a body is projected in space, and subjected to the action of gravity, whose effect varies inversely as the square of the distance, a conic section, having a focus at the centre of force, is described. The conic section, traversed by the planets, is an ellipse, the sun being in one of its foci, and the spaces described by the radius-vectors, respectively, are always equal in equal times [see PLANET]. The Algebraic expressions for the radius-vectors of the different conic sections are termed the *Polar equations* of these curves.

RADIX (a root: *Lat.*), in Algebra, the root of a finite expression, from which a series is derived.——In Botany, a root, or that organ of a vegetable through which it draws its nourishment. [See BOTANY.]——In Etymology, a primitive word, from which spring other words.——In Logarithms, that number whose logarithm is unity.

RAFT (*rafte*: *Dan.*, from *ratis*: *Lat.*), a sort of float, consisting of boards fastened together side by side: sometimes used for saving persons who lose their vessel at sea.——Also, a quantity of timber, fastened together by chains for the purpose of being more conveniently floated down a river.

RAFT'ERS (*ræfter*: *Dan.*), pieces of timber extending from the wall of a building, so as to meet in an angle at the top, and form the roof.

RAG'STONE, a local name for certain rocks. The Kentish ragstone is a calcareous rock, now much used for building purposes, which forms a division of the lower greensand. The Coral Rag, an oolitic limestone, containing abundant remains of corals, is well developed in Oxfordshire. It is a member of the middle oolite.

RAGU'LED, or **RAG'GED**, in Heraldry, an epithet for any bearing that is ragged or uneven, like the trunk or limb of a tree lopped of its branches, so that only the stumps are seen.

RAIL, a name given to several wading birds. The land rail, *Crex pratensis*, comes to us in the summer, and derives its name of corncrake from its call note. It frequents grassy places in the neighbourhood of rivers, and fields of green corn. It is much esteemed by epicures. The spotted crake is a prettily marked bird of the same genus, but much rarer than the last. The water rail, *Rallus aquaticus*, remains with us through the year, haunting the rank vegetation of marshes. The bill and the middle toe are much longer than in the land rail.

RAILWAYS, or **RAILROADS**. Among the most wonderful features which mark the progress of science in the nineteenth century is the vast and increasing extent of the substitution of mechanical for animal power—ingenious in most operations, exciting our admiration in many, but excelling all in its application to the purposes of travelling.

Nearly two centuries before the introduction of the locomotive, wooden rails were used at the collieries, in the north of England; their upper surfaces being, at a later period, covered with a plate or bar of iron, to render them more durable; and about the year 1776, flanges being added to them to keep the waggons from running off. The imperfections of *plate*, or as they were also called *tram* rails, led about the year 1801 to the adoption of *edge rails*, or those at present exclusively used; and, soon after, cast iron was supplanted by wrought iron, in their manufacture. The use of locomotives, instead of animals, was suggested, in 1794; but no locomotive seems to have been constructed until 1805. At first cogged wheels, and various kinds of *propellers*, were employed with locomotives, from an erroneous supposition that there would not be sufficient friction between the driving wheels and rails to prevent the former from turning round, without the production of progressive motions; but in 1814, plain wheels were tried and found perfectly efficient. The locomotive did not come into practical use until the opening of the Liverpool and Manchester Railway in 1830; although the first railway Act received the sanction of the British legislature in 1801, by the incorporation of the Surrey iron railway company. This was indeed a comparatively trifling enterprise, for it extended only from Wandsworth to Croydon, and was merely applicable for the carriage of coals, lime, &c., the moving power being derived from horses alone.——The *rails*. The breadth of an *edge rail* does not in general exceed two inches, and the carriage is kept on the line by means of flanges on the outer part of the rim of the wheel. These flanges ought never to touch the rail on account of the great resistance they cause; and they are in ordinary circumstances prevented from doing so, by the wheels being bevelled on the rim, so that the exterior diameter is less than the interior. The rails are formed in bars, fixed at each end, and at intermediate points, in cast iron *chairs*, which rest on sleepers, for which wood has been found the best material. They are now straight: those rails which are *fishbellied*, or thicker underneath at the centre, being more expensive and not so convenient, nor of greater practical strength. Cast iron rails are at first much cheaper than malleable iron ones, but not in the end; for not only are malleable rails more durable than those made of cast iron, but malleable rails when in use are less susceptible to the deteriorating action of the atmosphere.——*Inclined planes*. Where the inclination of the road is greater than that for which the ordinary power is calculated the ascent must be effected by means of an additional power, the amount of which can be readily computed, since in those parts no additional friction is to be provided for, and only the additional resistance arising from gravity is to be overcome. If, for instance, the additional inclination is one in ninety-six, or fifty-five feet in a mile, the additional power must be to the weight as one to ninety-six, or as fifty-five to the number of feet in a mile, namely, 5280. In descending planes so much inclined that the gravity would move the carriages too rapidly for safety, the velocity is checked by means of a break, which consists of a piece of wood of the same curvature as the rim of the set of wheels, upon which it is pressed by means of a lever, so adjusted as to be within reach of the conductor, in his position on the carriage.——*Curves.* Deviations from the straight line, or railways, can be made only by curves, angles being incompatible with speed. In passing along a curve, centrifugal force tends to throw the carriages off the line; this has been to a certain extent counteracted by raising the outer rail and giving a conical form to the wheel. The friction of the flanges against the rails is lessened, as curves of different radii are described with wheels, practically of a different size: for centrifugal force throws the larger parts of one set of wheels on the outer rail, and the smaller parts of the other on the inner rail; thus the wheels are not kept on the rails altogether by the flanges, as they have a natural tendency not to move in a straight line, but in a curve.——*Gauge of the line.* The determination of the gauge, or width between the rails, is a matter of great importance. Three different widths are used in England:—4 feet 8½ inches, 5 feet, and 7 feet; two in Scotland, 4 feet 6 inches and 5 feet 6 inches; and one differing from all these, in Ireland, 6 feet 2 inches.——*Slopes, Cuttings,* and *Embankments.* The cuttings and embankments must, if possible, balance each other. The quantity of material removed is sometimes enormous, amounting occasionally in a single cutting to 600,000 cubic yards.——*Bridges* and *Viaducts.* These form a most important portion of the construction of railways, and often are most serious items in their cost. In the 'high level' bridge at Newcastle, the roadway is 1380 feet in length, and the bridge 112½ feet from high water line. It is estimated that, in Britain, for every mile of railway, there are on an average from two to four bridges, many of them viaducts hundreds of feet in length. It is not necessary here to enter into the details of the great tubular bridge, over the Menai Straits, or that still more wonderful work, the great tubular bridge, about two miles in length, at Montreal in Lower Canada; they show, however, the vast undertakings often involved in the construction of a railway.——*Power.* Where the road is sufficiently and uniformly descending in one direction, gravity may be relied upon as a motive power in that direction; but on railroads generally, some other power must be resorted to in each direction. It was at first a great question as to whether stationary or locomotive steam-engines should be used, but after various experiments locomotives were preferred; and the opinion in favour of this kind of power on roads of which the inclination does not exceed about thirty feet in a mile, has become pretty fully established. Stationary power can be used to advantage only on lines of very great transportation, as the expense is necessarily very great, and almost the same whether the traffic be greater or less. Another objection to the use of stationary power is, that its interruption, in any part, breaks up the line for the time, which is not necessarily the case with a locomotive. The alternative, accordingly, is between the use of locomotive steam-engines or horses; and the fact seems well established, that where the transportation is sufficient for supplying adequate loads for locomotive engines, where the road is so constructed that they can be advantageously used, and where fuel is not exceedingly expensive, they afford much the most economical motive power. In England, France, Belgium, Italy, Germany, nay, over the whole of the European continent, and on an infinitely more extended scale in the United States of America, Canada, &c., railroads are everywhere in progress. With regard to America, many circumstances conspire to assist in the construction of railways in that country—the alluvial plains, which often present a dead level for a hundred miles together, the great plenty of timber, and, more than all, the non-appropriation of the ground, which enables the projectors to buy it for a trifle, and, in the majority of cases, to get it for nothing. They have pushed these roads into the very bosom of the wilderness. Like the military roads of the Romans, they hold steadily and straight on through plain and morass, through lane, forest, and river, across the rugged Alleghanies, and the wild woods that skirt the banks of the Mohawk. Many of these roads have been finished for less than 5000 dollars a mile; the very best of them, made of English iron, and laid down on stone sleepers, have been completed for 29,000 dollars a mile, or about 6000*l.*, which is only one-seventh the cost of the Liverpool and Manchester line. The same method and dexterity which marks their steamboat travelling is seen here also; the engines are nearly all of American construction, having superseded those imported from England, and the engineers seem to have them under better control. There is no unnecessary expense about these railroads. The sleepers are often not filled up, and frequently, in passing a deep chasm, or rushing torrent, the bridge is only just wide enough for the rails. Most of these railroads are at present single tracks, which occasion delay when trains meet. The carriages are larger than ours, they are sometimes fifty feet long, and have a deck with verandahs; they are warmed by stoves in winter, are well ventilated, and being commodious, are fitted with washing apparatus, &c., and often furnished with a convenient means of changing them at night into comfortable sleeping apartments. The American engineers seem more dexterous than the English; the trains are stopped more rapidly and with apparently greater facility. The American engine carries a machine in front, which removes any obstacle from the rails, and is capable even of taking up cattle if they happen to get into the way; wood is burned in most of the engines. A traveller may pass with the greatest ease and convenience from any of the cities of Canada to New York in less than twenty-four hours, taking Niagara in his way, if he please. There are railroads throughout all the New England States to every town of importance, and some thousands of miles are in progress in the south and west. There is the least improvement in the slave states. In no other country may such vast tracts be traversed in so short a time as in America, and the facilities are every day increasing. The Ohio already joins the Delaware, by a railroad 350 miles long, and in a few years a traveller may be able to pass from the gulf of Newfoundland to the gulf of Mexico—from icebergs to orange groves—in a very few days.

RAILWAY, Atmospheric or Pneumatic.—This invention consisted in exhausting a tube lying between the rails, in front of a piston to which the carriages were attached by a convenient air-tight apparatus. The pressure of the air behind the piston forced it on, and consequently the carriages in connection with it. The exhaustion was effected by powerful air pumps, worked by a steam engine at the terminus. The contrivance seemed to answer very well; but it was not, in practice, found so economical as traction by locomotives. Something similar is being adapted, for the transmission of parcels underground, from one part of London to another; as the tube in this instance has no longitudinal opening for the purpose of connection with anything external, there is less complication and less leakage.

RAIN (*rægn: Sax.*), in Meteorology, vapour precipitated upon the earth in the form of drops of water. *Rain* is the return to the earth, in condensed drops, of the aqueous vapours which are continually rising into the atmosphere by evaporation: the condensation being occasioned by a change in the general temperature, by a collision produced by contrary currents, or by a cloud passing into a cold stratum of air. The power of the air to hold water in solution increases in a much higher ratio than the temperature. Hence, when two masses of air, saturated with moisture, and of different temperatures, are mixed, the resulting compound is not capable of holding the whole water in solution, and a part is, in consequence, precipitated as *rain*. As the whole atmosphere, when saturated, is calculated not to hold in solution more water than would form a sheet five inches in depth, while the mean annual deposit of rain and dew is probably from 35 to 40 inches, it is obvious that the supply of atmospheric moisture must be renewed many times in the course of a year. [See Air, Fog, &c.] The quantity of rain precipitated from the atmosphere depends upon a variety of circumstances—on the previous hygrometric state of the unmixed portions of air, their difference of heat, the elevation of their mean temperature, and the extent of the combination which takes place. When the deposition is slow, and the electricity set free by *change of state* [see Cloud] is not suddenly removed, the very minute aqueous globules remain suspended, and form clouds; but if the deposition be rapid and copious, and the electricity is more or less suddenly carried off, those particles conglomerate, and produce, according to the temperature of the medium through which they descend, rain, mist, snow, or hail.

RAIN'BOW, in Meteorology, an arch or semicircle exhibited in a rainy sky, and some similar situations, opposite to the sun, adorned with the prismatic colours, and formed by the refraction of the rays of light in spherical drops of water. The inner bow is produced by a refraction at the entrance of the drop, a reflection from its back, and a refraction at its exit, or by two refractions and one reflection. The outer bow by two refractions and two reflections within the drop; and, since much of the light is dispersed by the two reflections, the outer bow is fainter than the inner. As all the drops in a shower are affected at the same time, so all the colours of light are visible anywhere to a spectator whose back is to the sun, in circles which are from 54 to 51 degrees and from 42 to 40 degrees from the eye; but in the two bows the colours are reversed. A line passing from the sun through the eye of the spectator goes to the centre of the bow, so that the height of the bow is inversely as the height of the sun; and, if the sun is more than 42 or 54 degrees high, there can be no bow. Of course, as it is a mere optical effect, depending on the position of the eye, no two persons can see the same bow. An *artificial rainbow* may be produced in sunshine by scattering drops of water in any convenient way to a sufficient height in the air, and the spectator standing between them and the sun, with his back to the latter. Magnificent rainbows are often produced also by the mist and spray which rise from waterfalls.——Lunar Rainbow. The moon sometimes also exhibits the phenomenon of an Iris, by the refraction of her rays in drops of rain in the night time. The lunar bow has all the colours of the solar, but much fainter.——Marine Rainbow, a phenomenon sometimes observed in an agitated sea, when the wind carrying the tops of the waves aloft, and the sun's rays falling upon them, are refracted.

RAIN-GAUGE, or PLUVIOM'ETER (*pluvia*, rain; and *metron*, I measure: *Lat.*), an instrument to measure the quantity of rain which falls at any place in a given time. A very simple and convenient rain-gauge consists of a strong cylindrical vessel of copper terminated above by a funnel, having an opening which is some multiple of the sum of the areas of the copper vessel and of a glass tube of equal height, so fixed into one side of it that water in one will rise to the same height in the other; a graduated scale is attached to the glass tube. Suppose that the area of the opening of the funnel is ten times the area of the vessel and glass tube taken together, one tenth of an inch of rain will show an inch on the graduated scale attached to the tube. In fixing one of these gauges care must be taken that the rain may have free access to it; hence the tops of buildings are usually the best places. When the quantities of rain collected in them at different places are compared, the instruments ought to be fixed at the same heights above the ground at both places, because it is found that, at different heights, the quantities are always different, even at the same place.

RAI'SINS (*grapes: Fr.*), grapes perfectly ripe, and dried either in an oven or by the heat of the sun; in the latter case they are richer and sweeter. The best raisins come from Spain, Portugal, Calabria, and other places in the south of Europe; there are also very fine ones brought from Smyrna, Damascus, and Egypt; their quality, however, in a great measure depends upon the method of their cure. The finest are those *of the sun*—the plumpest bunches are left to ripen fully upon the vine, after their stalks have been half cut through. [See GRAPE.]

RA'JAH (*Sanscrit*), a title given to the native princes of India, their dominions being termed *raj*. The words are connected with the Latin *rex, regis*, king.

RAKE, the nautical language to *incline*. The word is applied to masts, sterns, sternposts, &c. Masts generally rake aft: some few of them rake forward. The rake of the mast has considerable influence on the rate of sailing; its chief effect seems to be the diminishing that tendency which all sails have, to depress the ship's head.——*To rake a ship*, is to fire into her head, or stern, in the direction of her length, or along her decks; so as to sweep them from end to end, and thus, probably, cause great slaughter. It is similar to what is termed *enfilading* by engineers.

RALLENTAN'DO, in Music, an Italian term, implying that the time of the passage over which it is placed is to be gradually rendered slower.

RAL'LUS, in Ornithology, the *Rail*, which see.

RAM (*Sax.*), in Zoology, the male of the sheep or ovine genus; in some parts of England called a *tup*.——*Ram*, in Astronomy [See ARIES]. See also BATTERING RAM.

RAM'ADAN, or RHAM'ADAN, the great fast or lent of the Mohammedans. It begins with the new moon of the ninth month of the Mohammedan year; and ends the day preceding the *Bairam*. During the Ramadan, the day is spent in devotion; and the night also, by the more rigid. But, generally speaking, the arrival of sunset is the commencement of indulgence in the pleasures of the table. The Mahometans call this month holy, and believe that as long as it lasts the gates of paradise are open, and those of hell shut.

RAMEN'TUM (*scrapings or chips: Lat.*), in Botany, the loose scales that are frequently found on the stalks of the fronds of ferns.

RAMIFICA'TION (*ramus*, a branch; and *facio*, I make: *Lat.*), any small branch issuing from a large one, particularly the very minute branches issuing from the larger arteries.——In Botany, the manner in which a tree produces its branches or boughs.

RA'MOUS (*ramosus*, branching: *Lat.*), in Botany, having lateral divisions or being full of branches.

RAMP (*rampe*, a slope: *Fr.*), in Architecture, a concave bend, or slope, in any upper member.

RAM'PANT (*Fr.*), in Heraldry, an epithet for a lion, leopard, or other beast, when it stands on its hinder legs, and rears up its fore feet in the posture of climbing, showing only its profile. It is different from *salient*, in which the beast seems to be springing forward.——*Rampant gardant*, is when the animal stands on its hinder legs, looking full-faced; *Rampant regardant*, when it stands on its hinder legs, but looks behind.

RAM'PART (*rempart: Fr.*), in Fortification, an elevation or mound of earth round a place, capable of resisting the cannon of an enemy; and formed into bastions, curtains, &c. It is made of earth, taken out of the ditch; and the lower part of its outward slope is usually formed of masonry. The advantage of earth is that balls bury themselves in it, instead of splintering the works and rebounding, to the great injury of the besieged. It is, therefore, more durable than stone or bricks. The rampart is generally about eighteen feet in height.

RA'NA (a frog: *Lat.*), in Zoology, a genus of batrachian reptiles, including the frogs.

RANGE, in Gunnery, the horizontal distance to which a shot or shell is projected. But for the resistance of the air the path of a projectile would be a *parabola;* and the greatest range would be obtained by discharging the projectile at an angle of 45°. But the path actually described is very different from a parabola; and the angle producing the greatest range can be found only by experiment.——RANGE, among Mariners, a quantity of cable, equal to the depth of the water, laid on deck, that when the anchor is cast loose from the bow it may receive no check before it reaches the bottom.

RA'NGER (*ranger*, to place: *Fr.*), an officer whose duty it was to walk through the forest, and present all trespassers at the next forest court. The rangerships of the royal forests are honorary offices, with salaries attached.

RANK (*ranc: Sax.*), the degree of elevation which one man holds in respect to another. This is particularly defined with regard to the nobility, to all officers of state, and all officers of the army and navy.——RANK, in military tactics, the straight line which the soldiers of a battalion or squadron make as they stand side by side.——RANK AND FILE, a name given to the men carrying firelocks, and standing in the ranks, in which are included the corporals.

RAN'SOM (*rançon: Fr.*), money paid for redeeming a captive, or for obtaining the liberty of a prisoner of war.

RAN'TERS, a sect which took its rise in

a secession from the Wesleyan connection, on the ground that too much attention was paid to order in conducting religious worship; and too little zeal was displayed in field preaching. The Ranters parade the streets and fields, singing hymns and preaching. And, unlike all other Methodists, they allow females to address a congregation. They hold camp meetings annually, and differ from the parent stock in many of the outward ceremonies. They are most numerous in America.

RA'NULA (*Lat.*: a *dim.* of *rana*, a frog), in Medicine, a tumour under the tongue, supposed to bear some resemblance to a frog. It generally arises from some obstruction of the ducts of the salivary glands; and usually results in a troublesome ulcer.

RANUNCULA'CEÆ, a natural order of exogenous polypetalous plants, for the most part herbs. The calyx and corolla differ considerably in the different genera, amongst which are to be found the well-known buttercups (RANUNCULUS) ANEMONES, CLEMATIS, COLUMBINE, HELLEBORE, LARKSPUR, MONKSHOOD (ACONITUM), and PEONY. The stamens and seeds are usually numerous. The plants abound in cold damp climates, and possess narcotico-acrid properties, many being poisonous.

RANUN'CULUS (*Lat.*: a *dim.* of *rana*, a frog, because many of the species inhabit moist places), in Botany, a perennial much cultivated in gardens, bearing a flower of a globular shape. Also the systematic name of a genus of plants, of which the globe ranunculus, the crowfoot, and the buttercup, are species.

RANZ DES VACHES, in Music, airs among the Swiss shepherds, played while they tend their flocks and herds. It consists of a few simple intervals, is adapted to their instrument (the *Alpenhorn*, horn of the Alps), and has an uncommon effect in the echoes of the mountains. This effect becoming intimately associated with the locality of Switzerland, explains the many anecdotes of the home-sickness caused by the sound of the *Ranz des Vaches*, when heard by Swiss in foreign countries.

RAPE, a division of a county; it sometimes means the same as a hundred, and at other times includes several hundreds: thus Sussex is divided into six *rapes*, every one of which, besides its hundreds, has a castle, a river, and a forest belonging to it. Similar districts in other counties are called tithings, lathes, or wapentakes.——In Botany, a biennial plant, the *Brassica rapa* of botanists. Rape is cultivated in many parts of England, partly on account of its seed, which is crushed for oil, and partly for its leaves as food for sheep.——RAPE-CAKE is the adhering masses of the husks of rapeseed, after the oil has been expressed; they are reduced to powder by a malt-mill or other machine, and are used either as a top-dressing for crops of different kinds, or are drilled along with turnip seed.

RAPH'ANUS (*Lat*: from *raphanos*; *Gr.*), in Botany, a genus of plants, nat. ord. *Cruciferæ*, containing the radish, of which many varieties are in cultivation.

RA'PHE (*raphē*, a line: *Gr.*), in Anatomy, a term applied to any parts which appear as if they had been sewed together, a distinct seam being observable.——In Botany, the vascular cord connecting the nucleus of an ovule and the placenta, in those cases where the base of the former is removed from the hilum.

RAPH'IDES (*raphis*, a needle: *Gr.*), in Botany, the needle-like crystals frequently found in the cells of plants. They are of microscopic minuteness and usually consist of phosphate and oxalate of lime.

RAPHID'IA (*raphis*, a needle: *Gr.*), in Etymology, a genus of neuropterous insects. The head is of a horny substance and depressed; the tail is armed with a slender horny weapon, not bifid at the extremity. They are common in the neighbourhood of woods and streams in July; and from the facility with which they turn the front of the body, they have been called *snake flies*.

RAP'IDS (*rapidus*, swift: *Lat.*), the part of a river where the velocity of the current is very considerable, owing to a descent of the earth, not sufficient to occasion such a fall of the water as is deemed a cascade or cataract.

RAREFAC'TION (*rarefacio*, I make thin: *Lat.*), in Physics, the act or process of expanding or distending bodies; so that, the intervals between their particles being augmented, they occupy more room, or appear under a larger bulk without accession of any new matter. Rarefaction is opposed to *condensation*. It has been proved, by experiments with the air pump, that air may be so rarefied as to occupy a space 13,000 times greater than in ordinary circumstances. [See AIR, ATMOSPHERE, &c.]

RASO'RES (scratchers: *Lat.*), an order of birds, synonymous with the *Gallinæ*, and including those which have strong feet, provided with obtuse claws for scratching grains, &c., such as the pheasants, grouse, and barn-door fowl.

RAS'PBERRY, the fruit of a bramble, or species of *Rubus*. Several varieties are cultivated, differing in the size and colour of the fruit, which is either red, flesh-coloured, or yellow. A light soil is best suited to the culture of the raspberry, and an eastern or western exposure, slightly shaded. It is generally propagated by suckers.

RAT (*Fr.*), a well known quadruped of the genus *Mus*, which infests houses, stores, and ships; an animal equally troublesome and destructive. The species at present common in this country, called the Norway rat (*Mus decumanus*) was introduced from Asia forty or fifty years ago, and has entirely extirpated the *black rat* (*M. rattus*), or old British species.

RATAFI'A, a liquor made by steeping the kernels of apricots, cherries, &c. in brandy. In France, *ratafia* is the generic name of all *liqueurs* compounded with alcohol, sugar, and the odoriferous or flavouring principles of vegetables.

RATCHET, in Horology, &c., an arm, moving on a centre at one extremity, and abutting at the other against the teeth of the *ratchet* wheel, which it allows to turn in one direction, but not in the others, in which case it is called also a *detent*. Sometimes a ratchet is jointed freely to a reciprocating driver, for the purpose of giving continuous motion to a wheel; it is then called a *click* or *paul*. The teeth of the detent wheel are cut like those of a saw.

RATCH'IL, among Miners, fragments of stone.

RATE (*ratus*, calculated: *Lat.*), an assessment by the pound for public purposes; as, for the poor, the highways, church repairs, county expenses, &c.

RATE OF A SHIP, in the Navy, the order or class of a ship, according to its magnitude or force. There are three classes of ships: *rated ships*, commanded by captains; *sloops* and *vessels*, by commanders; and *third class*, by lieutenants. Rated ships are divided into six classes:—1st, three-deckers; 2nd, two-deckers, having at least 700 men; 3rd, ships having from 600 to 800 men; 4th, ships having from 400 to 600 men; 5th, ships having from 250 to 400 men; 6th, ships having less than 250 men.

RATH' OFFICE, in Mineralogy, a kind of garnet found in Sweden. Its colour is a dingy brownish black, and it is accompanied with calcareous spar and small crystals of Hornblende.

RATIFICA'TION (*ratus*, established; and *facio*, I make: *Lat.*), the solemn act by which authority is given to an instrument, &c. It is most usually applied to the sanctions given by government to treaties contracted by their representatives.

RA'TIO (*Lat.*), in Mathematics, the relations between two quantities; an *arithmetical ratio* consists in their difference, and a *geometrical ratio*, in their quotient. Thus, the arithmetical ratio between 8 and 6 is 8 − 6, or 2, which added to the less will make the greater; or taken from the greater will make the less. The geometrical ratio between 6 and 2 is $\frac{6}{2}$ or 3, and the less being multiplied by 3 will make the greater; or the greater divided by 8 will make the less. Ratio is expressed by two dots, thus $a : b$, or 6 : 4. Ratios are susceptible of various changes in form, without alteration of value. Thus the same quantity may be added to or taken from each term of an arithmetical ratio, &c. Each term of a geometrical ratio may be multiplied or divided by the same number. The first term of a ratio is termed the *antecedent*, the second the *consequent*, the equality of ratios constitutes *proportion* [which see]. Ratios are compounded by multiplying the antecedents together, and the consequents together, and this is the foundation of the rule of compound proportion. Duplicate ratio is the ratio of the squares of two quantities thus $a^2 : b^2$ is the duplicate ratio of $a : b$. Triplicate ratio is the ratio of the cubes of two quantities: thus $a^3 : b^3$ is the triplicate ratio of $a : b$.—*Prime* and *ultimate ratio*, the relation which two variable quantities bear to each other when they are first supposed to be generated, and are indefinitely small, hence called *prime*; or the relation of two variable quantities to each other at the instant of vanishing, or becoming indefinitely small, and hence called *ultimate* ratio.

RA'TION (*ratio*, a computation: *Lat.*), the proportion or fixed allowance of provisions, drink, forage, &c. assigned to each soldier for his daily subsistence. Seamen in the navy also have *rations* of certain articles.

RATIONA'LE (*ratio*, a theory: *Lat.*), the account or solution of any phenomenon, explaining the principles on which it depends.

RA'TIONALISTS (*ratio*, the reason: *Lat.*), a term used to denote those who consider all the events recorded in the Scriptures as events happening in the ordinary course of nature; and who consider the statements and morality of the sacred writings as subject to the test of human reason.

RAT'LINES, in a ship, lines which make the ladder steps for going up the shrouds and ascending to the mast-head.

RATOON', a sprout from the root of the sugar-cane, which has been cut.

RATTAN', a slender cane obtained from several species of *Calamus*, plants belonging to the order of palms, and growing in India and the Indian archipelago. The walking sticks imported under the name of Penang lawyers are a kind of rattan. Immense quantities are consumed in India and Europe, but more particularly in China. For cane work they should be chosen long, of a bright pale yellow colour, well glazed, of a small size, and not brittle.

RAT'TLESNAKE, the common name for certain poisonous snakes inhabiting America, and belonging to the genus *Crotalus* (*krotalon*, a rattle: *Gr.*), from three to eight feet in length, with several horny cells at the tail, which, when moved, produce a loud rattling noise. The head is broad, triangular, and flat; the eyes brilliant, the mouth large, and the tongue forked. The sound of the rattle is said to be audible at the distance of twenty yards, and is thus useful in giving warning of the approach of the reptile. Its bite is attended with frightful consequences. There are two species, the *Crotalus horridus* of the United States, and the *Crotalus durissimus* of Guiana. They are sluggish, move slowly, and bite only when provoked, or to kill their prey. They feed chiefly on birds, squirrels, &c., which they are supposed to have the power of fascinating.

RAT'TLESNAKE ROOT, a North American plant, the *Polygala senega* of botanists. It is a stimulant, and is believed to be serviceable in case of the bite of a rattle-snake.

RAV'ELIN, in Fortification, a detached work composed of two faces, forming salient angles, and raised before the counterscarp. When used to cover the approach to a bridge, it is called a *tête du pont*. It is employed also in field fortification.

RA'VEN (*hræfn*: *A. Sax.*), the *Corvus corax* of ornithologists, a well known bold and sagacious British bird, the largest of the genus with us. It builds in high trees or rocks; is long lived, feeds on all sorts of carrion, and has an exquisite sense of smell.

RAY (*raie*: *Fr.*; from *radius*: *Lat.*), in Optics, a beam of light, propagated from a radiant point; said to be *direct*, if it comes immediately from the point; *reflected*, if it first strike upon any body, and is thence transmitted to the eye. The mixed solar beam contains: 1st. *calorific rays*, producing heat, but not vision and colour; 2nd. *colorific rays*, producing vision and colour, but not heat; 3rd. *chemical rays*, producing certain effects on the composition of bodies, but neither heat, vision, nor colour. A ray of white light is compounded of several colours [see COLOUR]; and it is divisible into two rays of white light, having different properties. [See POLARISATION.]——In Botany, the outer part or circumference of a compound radiate flower.——In Ichthyology, a bony or cartilaginous ossicle in the fins of fishes, serving to support the membrane.

RAY'-FISH, the common name for fishes with cartilaginous bones, belonging to the genus *Raia* of ichthyologists. They are distinguished by their flattened and broad dish-shaped body, that chiefly consists of immense pectoral fins, the rays of which support a broad duplicature of the skin, which is continuous anteriorly with that of the side of the flattened head. The mouth is on the underside of the body, where also are the gill openings in two rows of fins. The genus *Raia* includes the Skates and the Thornback. The sting ray and the eagle ray belong to allied genera; whilst the electric ray is a torpedo.

RAY'AH, the non-Mahomedan subjects of the Turkish Government, who pay the capitation tax.

RAYONNA'NT, in Heraldry, an epithet for any ordinary that darts forth rays like the sun when it shines.

RE, in Grammar, a prefix or inseparable particle at the beginning of words, to repeat or otherwise modify their meaning; as in *re*-action, *re*-export, &c.

REACH, that part of the length of a river in which the stream maintains the same direction.

REAC'TION (*re*, back; and *actio*, an acting: *Lat.*), in Physics, the resistance made by all bodies to a change from motion to rest or from rest to motion. It is in reality due to the necessity of a body at rest receiving motion, before it can move; or a body in motion losing motion, before it can stop, both of which require time.

REA'GENT (*re*, back; and *ago*, I act: *Lat.*), in Chemistry, the name given to such bodies as serve to detect others.

REAL (*res*, property: *Lat.*), in Law, pertaining to things permanent and immovable; as *real* estate, consisting of lands, tenements, and hereditaments, and opposed to *personal* or *movable* property. *Real assets*, assets consisting in real estate, or lands and tenements descending to an heir, sufficient to answer the charges upon the estate created by the ancestor.

REAL'GAR, red sulphuret of arsenic. It is either native or factitious.

RE'ALISM, in Philosophy, the opposite of *Idealism:* that philosophical system which conceives external things to exist independently of our conceptions of them. Realism becomes materialism if it considers matter, or physical substance, as the only original cause of things, and the soul itself as a material substance. As opposed to *Nominalism*, it is contrary to the theory which asserts that *general terms* have no corresponding reality, either in or out of our minds, being mere words, and nothing more.

REALM (*royaume*, a kingdom: *Fr.*), a royal jurisdiction, or the extent of a king's dominions.

REAL PRES'ENCE, in the Roman Catholic church, the supposed actual presence of the body and blood of Christ in the eucharist, the bread and wine being supposed to be converted into the real body and blood of Christ by the priest.

REAM (a bundle: *Sax.*), a certain quantity of paper. Twenty quires of twenty-four sheets each make a ream of writing paper; but the *printer's ream*, or *perfect* ream of printing paper, consists of 21½ quires, or 516 sheets. Two reams make what is termed a *bundle*.

REAR (*arrière: Fr.*), a military term for behind.——*Rear-guard*, a body of men that marches in the rear of the main body to protect it.——*Rear-rank*, the last line of men that are drawn up two or more deep.——The *rear* is also a naval term applied to the squadron which is hindmost.

RE'ASON (*raison: Fr.*), a faculty of the human mind by which it distinguishes truth from falsehood, and good from evil, and which enables the possessor to deduce inferences from facts or from propositions. Reason differs from *understanding*, which is the faculty of reflection and generalization; and from *instinct*, which is a mere natural impulse, by which animals are directed to certain actions, necessary for the preservation of the individual or the species. Instinct has nothing to do with reflection or experience; the wasp, in whatever solitude it may be reared, puts a food which it does not use itself, along with its eggs, into a hole; and just enough of it to support the larva, which it will never see, until it is able to provide for itself.

RE'ASONING, or RATIOCINA'TION (*ratiocinatio: Lat.*), an operation of the mind, deducing some unknown proposition from others that are evident and known. Every act of reasoning necessarily includes three distinct judgments; two, in which the ideas whose relation we want to discover are severally compared with the middle idea; and a third, in which they are themselves connected, or disjoined, according to the result of that comparison. Now, as our judgments when put into words are called Propositions, so the expressions of our reasonings are termed Syllogisms. And hence it follows that as every act of reasoning implies three several judgments, so every syllogism must include three distinct propositions. [See SYLLOGISM.]

RE'BATE (*rabattre*, to abate: *Fr.*), in Architecture, the groove, or channel, sunk on the edge of any material.——In arithmetic, *Discount*, which see.

RE'BEC. An instrument like a violin, having three strings tuned in fifths, and played with a bow. It was introduced by the Moors into Spain.

REB'EL (*rebellis: Lat.*), one who revolts from the Government to which he owes allegiance, either by openly renouncing its authority, or by taking arms and openly opposing it.

REBEL'LION (*rebellio*, a renewal of war by a conquered people: *Lat.*), an open and avowed renunciation of the authority of the government to which allegiance is due. It differs from *Insurrection*, which may be a rising in opposition to a particular act or law, without a design to renounce wholly all subjection to the government, and which may lead to, but is not necessarily in the first instance rebellion. Rebellion differs also from *Mutiny*, which is an insurrection of soldiers or sailors against the authority of their officers.

RE'BUS, an enigmatical representation of some name, &c., by using figures or pictures instead of words. Camden tells us the rebus was in great esteem among our forefathers.——In Heraldry, a coat of arms which bears an allusion to the name of a person.

REBUT'TER (*rebuter*, to repulse: *Fr.*), in Law, the defendant's answer to the plaintiff's sur-rejoinder. The fifth stage of the proceedings in an action if an issue has not been previously come to.

RECEIPT' (*receptus*, received: *Lat.*), in Commerce, an acquittance or discharge in writing for money received, or other valuable consideration.

RECE'IVER (*recevoir*, to receive: *Fr.*), in Law, one who takes stolen goods from a thief, knowing them to be stolen, and incurs the guilt of partaking in the crime. Also, one appointed to receive the rents, &c., accruing from the estate of an embarrassed person, for the benefit of his creditors.——In Pneumatics, a glass vessel for containing that on which an experiment is to be made with the air-pump.

RE'CENT (*recens*, lately: *Lat.*), a Geological term applied to whatever is of a date posterior to the introduction of man; all formations since that period being so termed. The word is also used in Natural History, in contradistinction to *extinct*.

RECEP'TACLE (*receptaculum*, a place into which anything is received: *Lat.*), in Botany, the expanded summit of the flower stalk upon which numerous florets are seated. In the order of *Compositæ* the receptacle is flat, convex, or conical; in the Fig order the receptacle is fleshy and hollow; it is the part we eat, and contains the seeds within, where the small flowers originally were.

RE'CIPE (take: *Lat.*), a Medical prescription; or directions for preparing any mixture or compound. *R*, at the head of a medical prescription, signifies *recipe*.

RECIP'ROCAL (*reciprocus*, alternating: *Lat.*), in general, something that is mutual, or which is returned equally on both sides, or that affects both parties alike.——*Reciprocal figures*, in Geometry, are those which are of the same kind—triangles, for example, prisms, &c.; and so related that two sides of one form the *extremes* of a proportion, of which two corresponding sides of the other form the *means*.——*Reciprocal proportions*, is when of four terms, taken in order, the first is to the second, as the fourth is to the third: or when the first is to the second, as the reciprocal of the third is to the reciprocal of the fourth. It is often termed *Inverse proportion*.——*Reciprocal quantities*, or *reciprocals*, are the terms of the fractions representing the quantities inverted: thus the reciprocal of $\frac{3}{4}$ is $\frac{4}{3}$; the reciprocal of 5, or $\frac{5}{1}$, is $\frac{1}{5}$. A quantity multiplied by its reciprocal gives unity; thus $\frac{3}{4}$ multiplied by $\frac{4}{3}$, is equal $\frac{12}{12}$ or 1; and $\frac{5}{1}$ multiplied by $\frac{1}{5}$, is equal to $\frac{5}{5}$ or 1.——*Reciprocal terms*, in Logic, are those which have the same signification; and consequently are convertible and may be used for each other.

RECITATI'VE (*recito*, I recite: *Lat.*), a kind of musical pronunciation, in which the composer and the performer endeavour to imitate the inflections, accent, and emphasis of speech; such as that in which the several parts of the liturgy are rehearsed in cathedral churches, or that of actors on an operatic stage when they relate some event or reveal some design.

RECK'ONING (*recan*, to reckon: *Sax.*), in Navigation, an account of the ship's course and distance: the course being determined by the compass, and the distance by the log books, and no aid being had from observation.——*Dead reckoning*, is the *reckoning*, allowance being made for drift, lee-way, currents, &c.

REC'LINATE (*reclinis*, leaning back: *Lat.*), in Botany, bent downwards, so that the point of the leaf is lower than the base.

RECLINA'TION (*reclino*, I lean back: *Lat.*), in Dialling, the number of degrees which a dial-plane leans backwards from an exactly upright or vertical plane; that is, from the zenith.

RECOGN'IZANCE (*recognosco*, I recognize: *Lat.*), in Law, a bond or obligation acknowledged in some court, or before some judge, with condition to do some particular act, as to appear at the assizes, to keep the peace, &c. The person who enters into such bond is called the *recognizor*; the person to whom he is bound is the *recognizee*.

RECOIL' (*reculer*, to go back: *Fr.*), in Gunnery, the retrograde motion made by any piece on being discharged. This term is particularly applicable to pieces of ordnance, which are always subject to a recoil, according to the sizes and the charges which they contain. To lessen the recoil of a gun, the platforms are generally made sloping towards the embrasures.

RECONNOI'TRE (to discover: *Fr.*), in Military language, to learn by ocular inspection of the situation of an enemy, or the nature of a piece of ground. It is one of the most important duties of a general, and must precede every considerable movement. Reconnoitering not unfrequently brings on engagements: for large bodies of troops march out to cover the reconnoitering party, and to make prisoners if possible, in order to obtain information from them.

RECORD (*recordor*, I call to mind: *Lat.*), in Law, the authentic written testimony of the judgment of a superior court, contained in rolls of parchment and preserved in a court of record.

RECORD'ER (same *deriv.*), the chief judicial officer of a borough or city, exercising within it, in criminal matters, the jurisdictions of a court of record—whence his title. Recorders are now selected by the Crown, and must be barristers of at least five years' standing.

RECOV'ERY, or COMMON RECOVERY (*recouvrer*, to recover: *Fr.*), in Law, a mode of conveyance, by means of a fictitious action [see FINE], which gave the recoverer a fee simple absolute. Common recoveries are now abolished, and a new mode of conveyance for the use of the tenant in tail substituted. [See ESTATE TAIL.]

RECT'ANGLE (*rectus angulus*, a right angle: *Lat.*), a figure whose sides are perpendicular to each other. The term is also sometimes used, but incorrectly, for the product of two quantities.

RECTIFICA'TION (*rectus*, right; and *facio*, I make: *Lat.*), in Chemistry, the process of refining by repeated distillation or sublimation, in order to render the substance purer.

REC'TOR (a director: *Lat.*), a term applied to the possessors of several official situations; as, 1. A clergyman who has the charge and cure of a parish, and the property of the tithes, &c.; 2. The chief elective officer in several universities; 3. The head master of large public schools in Scotland; 4. The governor in several convents; 5. The superior of a seminary or college of the Jesuits, &c.

REC'TUM (*rectus*, straight: *Lat.*), in Anatomy, the third and last of the large intestines: so called by the older anatomists, from an erroneous idea that it was straight.

REC'TUS (straight: *Lat.*), in Anatomy, a name common to several pairs of muscles, so called on account of the straightness of their fibres.

REC'TUS IN CU'RIA (right, in the eye of the court: *Lat.*), in Law, one who stands at the bar, no person objecting anything against him. Also, one who has reversed an outlawry, and can therefore partake of the benefit of the law.

RECUR'RENT VERSES (*recurro*, I return: *Lat.*), in Poetry, verses that read the same backwards as they do forwards.

RECUR'RING (same *deriv.*), or **CIRCULATING DECIMALS**, those decimals which arise from the divisions of the numerator of a fraction by its denominator; when the denominator includes, as factors, one or more prime numbers, different from 2 or 5, and not included in the numerator, the digits in such a case are repeated, *ad infinitum*. If only a single digit is repeated, it is a *repetend*; if two or more digits, a *periodical*; if there is also a finite part, that is one or more digits before the repeated part, it is a *mixed*, otherwise it is a *pure circulate*.

RECUR'VATE (*recurvo*, I bend backwards: *Lat.*), in Botany, bowed or curved downwards.

RECU'SANT (*recuso*, I refuse: *Lat.*), in English History, one who refuses to acknowledge the kingly supremacy in matters of religion.

RED, in Physics, one of the simple or primary colours of natural bodies, or rather of the rays of light. It has different shades or hues, as scarlet, crimson, vermillion, orange-red, &c.——The Greeks called the Arabian gulf the *Erythrean* or *Red* sea, probably from Edom or Idumea; improperly applying the meaning of Edom (red) to the sea, which improper application has been continued to the present time. It is, however, conjectured by some that the name was given on account of the vast quantity of red animalcules which the sea contains.

RED BOOK, a book containing the names of all persons in the service of the state.——RED BOOK OF THE EXCHEQUER, an ancient record, in which are set down the names of all who held lands *per baroniam*, in the time of Henry II.

RED'BREAST, the *Erythaca* (or *Sylvia*) *rubecula* of ornithologists, a well-known bird. Its fame has arisen from its habit of seeking the aid of man, and fearlessly visiting his dwelling, during the winter season.

REDEMP'TION (*redemptio*; from *redimo*, I buy back: *Lat.*), in Law, the liberation of an estate from a mortgage.——In War and in Commerce, the act of procuring the deliverance of persons or things from the possession and power of captors by the payment of an equivalent; as, the *redemption* of a ship and cargo.——In Theology, the ransom or deliverance of sinners from the bondage of sin, and the penalties of God's violated law, by the atonement of Christ.

RED LEAD, *Minium*; an oxide of lead, intermediate between the protoxide and peroxide.

REDOUBT' (*redoute*, from *redouter*, to fear: *Fr.*), in Fortification, almost any kind of work, used to fortify a military position, as those constructed within others, to prolong a defence; or detached works, to secure a piece of ground, useful to the besiegers.

REDPOLE, a name given to two species of the genus *Linota*, or linnet; namely, the mealy redpole (*L. canescens*), and the lesser or common redpole (*L. linaria*), both of which are winter visitors to our islands. The latter is easily tamed, and its lively habits and easy confidence render it a favourite.

RED SAN'DAL, or RED SAN'DERS. The wood of leguminous trees growing in Ceylon and other parts of India, belonging to the genus *Pterocarpus*. It is of a garnet-red colour, and extremely hard. The old wood only is employed as a dye stuff, and the colouring matter which it yields is by chemists known as *santaline*.

RED'START, the *Phœnicura rutacilla*, a beautiful bird, about five inches in length, which comes to this country about the middle of April, and leaves it in the beginning of October. The tail is of a reddish hue, whence the name, start being an old English word for tail.

REDUC'TIO AD ABSURDUM (a reducing to an absurdity: *Lat.*), in Logic, a mode of argument by which the truth of a proposi tion is proved by showing the absurdity of the contrary.

REDUC'TION (*reductio*, a restoring: *Lat.*), in Arithmetic, the change of a quantity from one denomination to another.——REDUCTION, the conversion of a metallic compound into a metal. It is sometimes effected by heat alone, oxygen being driven off; but it generally requires along with heat, some deoxidising agent, charcoal being most commonly used for that purpose, on the large scale.

REDUC'TION OF EQUA'TIONS (*reductio*, a bringing back: *Lat.*), in Algebra, reducing them to the simplest state, or clearing them of all superfluous quantities, by separating the known from the unknown, till the unknown quantity is found on one side, and the known ones on the other.

REDUPLICA'TION (*re*, again; and *duplicatio*, a doubling: *Lat.*), in Logic, a kind of condition expressed in a proposition; indicating or assigning the manner in which the predicate is attributed to the subject.

REED (*reod: Sax.*), the common name of many aquatic plants. In general, it denotes a kind of long, hollow, knotted grass that grows in fens and watery places.——REED, in Music, the small elastic plate which, by its vibration, produces the sound of certain instruments.

REEF, amongst Australian gold-miners, a vein of quartz, penetrating rocks of siluvian age, and varying in thickness from a few inches to forty or fifty feet, with a considerable extent as to length and depth. Gold is frequently found disseminated in such reefs, and is extracted by crushing the quartz to powder and treating it with mercury.

REE'FING (*reef*, a part of a sail taken in: *Dut.*), a nautical term for the taking up a sail in a great gale of wind, so as to diminish its surface.——REEF-TACKLE, a tackle upon deck, communicating with its pendant, passing through a block at the top-mast head, and through a hole in the top-sail yard-arm, and attached to a cringle below the lowest reef. It is used to pull the skirts of the top-sails close to the extremities of the yards, to lighten the labour of reefing.

REENTERING ANGLE, in Fortification, the angle of a work which points inwards, towards the place to be defended.

REFEC'TION (*refectio*, a refreshment: *Lat.*), among certain Ecclesiastics, a spare meal or repast just sufficing for the support of life; hence the hall in convents, and other communities, where the monks, nuns, &c. take their refections or meals in common, is called the *refectory*.

REFEREE' (*refero*, I consult: *Lat.*), one to whose decision a thing is referred; particularly, a person appointed by a court to hear, examine, and decide a cause between parties, pending before the court.

REF'ERENCE (same *deriv.*), in Law, the act of referring a matter in dispute to the decision of an arbitrator. Also, in the court of chancery, the referring a matter to a chief clerk, taxing master, &c., to examine and certify the result.——REFERENCE, in Printing, a mark in the text of a work referring to a similar one in the side or at the bottom of the page.

REFI'NING (*raffiner*, to purify: *Fr.*), in general, is the art or practice of purifying a thing; including not only the assaying or refining of metals, but likewise the clarification of liquors.

REFLEC'TION, or REFLEX'ION (*reflecto*, I bend back: *Lat.*), in Mechanics, the rebound of one body from the surface of another.——REFLECTION OF LIGHT, the turning of a ray from a body against which it has impinged; a reflecting is necessarily a polished surface. Light and heat, in reflections, follow the law of perfectly elastic bodies; that is, 'the angle of incidence is equal to the angle of reflection.' This enables us to ascertain with ease the path of a reflected ray; and to explain how it is that: 1. Plane mirrors alter the apparent position but not the size of an object; 2. Concave mirrors bring rays to a focus, and either increase or diminish the apparent size of an object, according as it is in one or other of the conjugate foci; and 3. convex mirrors disperse rays, and diminish the apparent size of an object.

RE'FLEX (*reflexus*, bent back: *Lat.*), in Painting, a term used to denote those places in a picture which are supposed to be illuminated by a light reflected from some other body, represented in the same piece.——REFLEX VISION, that performed by means of reflected rays, as from mirrors.

REFORMA'TION (*reformatio*; from *reformo*, I amend: *Lat.*), the term applied by Protestants universally, to denote the change from the Roman Catholic to the Protestant religion, which was first begun effectually in Germany, by Luther, A.D. 1517, but had commenced in England one hundred years earlier by Wickliffe. No one anticipated the quarter whence the first blow would be struck. Leo X. was created pope in 1513; and, little affected by the universal desire for reformation in the church—a desire expressed in the strongest terms by the most eminent Roman Catholic writers of the time, who in unmeasured terms inveigh against the universal corruption of morals from the very head of the church down to its most humble members, he seemed placed at its head merely to employ its revenues in the gratification of his princely tastes. Albert, elector of Mentz and archbishop of Magdeburg, a prince of a similar character, received from Leo, in 1516, under the pretence of raising money for the erection of St. Peter's at Rome, permission to sell *indulgences* within his own jurisdiction, on condition of sharing the profits with the pope. In this traffic, Albert employed, among others, John Tetzel, a Dominican monk of Leipsic, who went about from place to place, carrying on his trade with the most unblushing assurance. Luther, an Augustine monk of Erfurt,—a man of powerful mind, and distinguished more for his ardent piety and strong love of truth than for deep erudition,—set his face against this abuse, first in his sermons, and afterwards in ninety-five theses, or questions, which he affixed to the door of the church, Oct. 31, 1517. This led to several public disputations, in which he had such a decided advantage over his antagonists, that he, who was hardly known before, became the public champion of all who lamented the degeneracy of the church. The Franciscans were intrusted with the sale of indulgences in Switzerland; and executed their commission with equal zeal and imprudence. They were successfully opposed by Zuinglius, who was not inferior to Luther himself in courage and determination. The disputes between the Roman Catholic and reformed churches were long a source of many calamities; arising from the attempts to arrest the progress of reformation; until they were terminated in Germany, by the peace of Augsburg in 1555. In this country the Reformation triumphed from the very beginning, with the exception of the interval of Mary's reign, and has remained permanent.

REFRAC'TION (*refractus*, broken: *Lat.*), in Optics, the deviation of a ray of light from a right line in entering a medium of different density. The great law of refraction, which holds with regard to all bodies and all mediums, is, that a body passing obliquely out of one medium into another in which it meets with less resistance, is refracted or turned towards the perpendicular; and, on the contrary, in passing out of one medium into another in which the resistance is greater, it is refracted or turned from the perpendicular.——The ratio of the lines of the angles of incidence and refraction is called the *index* of refraction: it is different in different media, and is obtained, for each, by experiment—being that which is obtained when light passes from a vacuum into the medium. It enables us to ascertain the path of a ray, passing through any medium, or any number of media; to ascertain the foci of convex media, and the amount of divergences produced by those which are concave. Whatever the number or kind of media through which a ray of light may pass, its path is the same, from whichever of its extremities it begins its motions.——*Astronomical refraction*, the apparent angular elevation of the celestial bodies above the true places; caused by the passage of light through the atmosphere of the earth. Since the refractive power of an æriform fluid is found to be proportional to its density, and the density of the air continually diminishes, as its distance from the earth increases, the path of a ray which traverses the atmosphere obliquely must be a curve. The existence of atmospheric refraction was known at a very early period. It is clear that the place of distant or elevated terrestrial objects must be affected by refraction due to the atmosphere: this effect is called *terrestrial refraction*.——*Double refraction*. Certain substances have the power of decomposing a ray of white light into two others, which are refracted at different angles, and are found to possess very different properties. [See DOUBLE REFRACTION and POLARIZATION.]

REFUGEE' (*refugio*, I take refuge with; *Lat.*), in Political History, a term applied to the French Protestants, who, on the revocation of the edict of Nantes, fled from the persecution of France. The same term was also applied to the French priests and other royalists who sought an asylum in this country at the commencement of the revolution, towards the end of the last century They were also styled *émigrés*.

REGA'LIA (things pertaining to the king: *Lat.*), in Law, the rights and prerogatives of the sovereign power; also the ensigns of royalty, the crown, sceptre, &c. worn by our kings and queens at their coronation. They consist of the Crown used at the coronation of Queen Victoria [see CROWN]. *St. Edward's Crown*, of gold embellished with diamonds and other precious stones, made for the coronation of Charles II., and used at all subsequent coronations except the last. It was stolen by Blood from the Tower in May, 1761. The *Prince of Wales' Crown*, of pure gold without jewels. *The Queen Consort's Crown*, of gold set with diamonds, and other stones. *The Queen's Diadem*, made for the queen of James II.; it is adorned with diamonds and pearls. *St. Edward's Staff*, of beaten gold four feet seven inches long, surmounted by an orb, containing, according to tradition, a part of the true cross. This is carried before the sovereign at a coronation. The *Royal Sceptre*, or sceptre with the cross, 2 feet 9 inches long, made of gold, the pommel embellished with rubies, emeralds, and diamonds; the cross with various jewels, and a large table diamond in the centre. This is placed in the sovereign's right hand at the coronation by the officiating archbishop. The *Rod of Equity*, or sceptre with the dove, made of gold enriched with diamonds. This is placed in the sovereign's left hand at a coronation. The *Queen Consort's Sceptre*, of gold adorned with precious stones. The *Ivory Sceptre*, made for the queen of James II. bearing a dove of white onyx. A *Sceptre* thought to have been made for Mary queen of William III. The *Curtana*, a pointless sword of mercy, made of steel adorned with gold. Two *Swords of Justice*, temporal and ecclesiastical, which are carried before the sovereign at a coronation. *Armillæ*, or bracelets; *Spurs;* the *Ampulla*, or anointing vessel, and *Spoon* for receiving the sacred oil from the ampulla;—all these objects being used at a coronation. The *Golden Salt Cellar*, shaped like a castle. The *Baptismal Font* employed at the christening of the royal children, and a service of sacramental plate. All these articles are preserved in the Tower of London, where the public is permitted to see them. *Regalia of the church*, are the rights and privileges which cathedrals, &c., enjoy by royal grants. This term is particularly used for such lands and hereditaments as have been given by different sovereigns to the church.

REGAR'DANT (*Fr.*), in Heraldry, looking behind; used for a lion, &c. with the face turned towards the back in an attitude of vigilance.

REGAT'TA, a name given to yacht and boat races on different parts of the coast, or on large rivers. The word is adopted from the *Regatta* in Venice, where boats containing one person only, contend for prizes on the canals that intersect that city.

REGELA'TION (freezing again: *Lat.*), a term applied to a property possessed by ice. If two pieces of it are brought into contact, even in hot water, they will be frozen together.

RE'GENT (*regens*, governing: *Lat.*), one who governs a kingdom during the minority, absence, or incapacity of the rightful monarch.——In English universities, a master of arts becomes a *regent*, after a short period, and therefore a member of the governing body of the university; having a vote in convocation and congregation, at Oxford, and in the senate at Cambridge.——A member of a board or corporate body in the state of New York, which has power to grant acts of incorporation for colleges, and to visit and inspect all colleges, academies, and schools in the state.

REG'IMEN (a guiding: *Lat.*), the regulation of diet, or in a more general sense, of all the non-naturals, with a view to preserve or restore health.——In Grammar, that part of syntax, or construction, which regulates the dependency of words; and the alterations which one occasions or requires in another connected with it.

REG'IMENT (*Fr*, from *rego*, I govern: *Lat.*), in Military affairs, a body of troops, either horse, foot, or artillery; the infantry consisting of one or more battalions, and commanded by a colonel or lieutenant-colonel.——*Regimentals*, the uniform clothing of the army.

RE'GION (*regio*; from *rego*, I govern: *Lat.*), in Geography, a large extent of land inhabited by many people of the same nation and inclosed within certain limits or bounds.

REG'ISTER (*registre*: *Fr.*), an official account of the proceedings of a public body, or a book in which are entered and recorded memoirs, acts, and minutes, for the purpose of preserving them, or making them easily accessible for reference.——*Register*, in printing, such an accurate arrangement of the lines and pages, that those printed on one side of the sheet shall fall exactly on those of the other.——Among letter-founders, the inner part of the mould in which the printing types are cast.——*Register*, in chemistry and the arts, an aperture with a lid, stopper, or sliding plate, in a furnace, stove &c., for regulating the admission of air, and thus increasing or diminishing the heat of the fire.——*Parish Register*, a book in which are recorded the baptisms of children, and the marriages and burials in a parish.——*Register ship*, a ship which obtained permission from the King of Spain, or the Council of the Indies, to trade to the Spanish West Indies; and was registered before sailing.

REGISTRATION OF DEEDS, the obligation, by law, which exists in certain places, of registering certain deeds. Its intention was to give notice to purchasers of incumbrances existing on estates. But a party actually or constructively aware of incumbrances not registered, is bound by such knowledge.

RE'GIUM DO'NUM (a royal gift: *Lat.*), an annual grant of public money in aid of the maintenance of the Presbyterian clergy in Ireland. It was first given by William III. in 1690, and the grant was remodelled in 1790.

RE'GIUS PROFES'SOR (a royal professor: *Lat.*), in Literature, a title given to five readers or lecturers in the university of Oxford; so called from these professorships having been founded by Henry VIII. In the Scottish universities this name is given to professors for whom a chair has been created with an endowment from the crown.

REG'LET, or RIG'LET (a *dim.* of *regle*, a rule: *Fr.*), in Architecture, a flat narrow moulding, used chiefly in panels and compartments, to separate the parts or members from each other, and to form knots, frets, and other ornaments.——In Printing, a ledge or thin slip of wood exactly planed, used to separate lines and make the work more open.

REGRA'TER (*regrattier*, to forestall: *Fr.*), one who buys and resells in the same fair or market. He differs from a *forestaller*, who is one that buys on the road to the market.

REG'ULA (a rule: *Lat.*), in Archæology, the book of rules, &c. of a monastery.

REG'ULAR BODIES, in Geometry, those which are comprehended by like equal and regular plane figures, whose solid angles are all equal.

REG'ULAR FIGURES, in Geometry, equilateral and equiangular polygons. Circles can be described within and about such figures.

REG'ULARS, in Military affairs, that part of the army which is entirely at the disposal of government.——In ecclesiastical history, *regulars* are such as live under some rule of obedience, and lead a monastic life. In this sense the *regular* differs from the *secular clergy* of the Roman Catholic Church, which performs parochial duties, as a matter of course.

REG'ULATOR (*regulo*, I direct: *Lat.*), in Machinery, any contrivance which produces a uniform movement; thus, a Fly, Fly-wheel, Governor, &c.——In Horology, an apparatus attached to the hair-spring of a watch, which, by *practically* lengthening or shortening the spiral spring attached to the balance, causes the watch to go slower or faster; in modern watches, it is generally a mere index; in those of older date, it is a pinion and segment. In each case, one end of the spring passes freely, but, in contact, through an aperture in a small piece which is movable along the spring.

REG'ULUS (a little king: *Lat.*), a term formerly employed by chemists, to denote metallic matters when separated from others by fusion. This term was used, because the alchemist expected to find gold, the king of metals, collected at the bottom of the crucible. Thus, *regulus of antimony*, *of bismuth*, &c.——REGULUS, or the Lion's Heart, a star of the first magnitude in the Lion; a constellation of the northern hemisphere; it is the α *Leonis* of astronomers.——*Regulus*, in Ornithology, a genus of birds belonging to the family of *Sylviadæ*, of which two species are found in this country. The crested wren is about the size of the common wren; the head, neck, and back are of a mixed green and gray colour; its breast and belly of a pale gray, and its wings variegated with black and yellow. The head of the male is ornamented with an orange-coloured crest or crown; whence the name *regulus*.

REIN'-DEER (*rennthier: Ger.*), the *Tarandus rangifer* of zoologists, the caribou of the Canadians, is a cervine quadruped which inhabits the northern regions of Europe, Asia, and America. It varies a good deal in size and colour, but in winter its coat is always white. It carries a pair of large antlers, which are shed annually. In America this animal is only known as a beast of chase, being hunted for food by the Indians and Esquimaux; but in Lapland and amongst the Ichukches, a people dwelling in the corner of Asia abutting on Behring's Straits, the rein-deer has been domesticated. It serves the Laplanders in place of horse, ox, and sheep, providing them with milk, cheese, flesh meat, and clothing, whilst yoked to a sledge it draws its master over snow many miles in a day. Its chief food in the wild state is the lichen, called reindeer moss, which grows luxuriantly in cold regions.

REINFO'RCE (*renforcer*, to strengthen: *Fr.*), in Artillery, the part of the gun which is nearest the breech; it is made stronger, to resist the explosive force of the powder. ——*Reinforce rings*, flat hoop-like mouldings, on the reinforce, next the breech. There are generally two, the first of which is the larger.

REI'TERS (*reiters*, riders: *Ger.*), German cavalry of the 14th and 15th centuries; they served on the Protestant side in the religious wars in France.

REJOIN'DER (*rejoindre*, to join: *Fr.*), in Law, the defendant's answer to the plaintiff's replication; it is the fourth stage in the pleadings in an action.

RELA'TION (*relatio: Lat.*), in Logic, one of the ten predicaments or accidents belonging to substance.——*Relation, inharmonical*, in Music, a term to express that some harsh and displeasing discord is produced in comparing the present note with the preceding chord.

REL'ATIVE (*relativus: Lat.*), in general, a term signifying not absolute, but considered as belonging to or respecting something else.——*Relative*, in Grammar, a word which relates to or represents another word, called its antecedent, or to a sentence or member of a sentence, or to a series of sentences, which constitutes its antecedent. —*Relative terms*, in Logic, terms which imply relation, as guardian and ward; husband and wife; master and servant.

RELAY' (*relais: Fr.*), a supply of horses ready on the road to relieve others, in order that a traveller may proceed without delay. In hunting, a *relay* signifies a fresh set of dogs, or horses, or both, placed in readiness, in case the game comes that way.

RELE'ASE, in Law, is a discharge or conveyance of a person's right in lands or tenements, to another who has some former state in possession. The words generally used in it are, 'remised, released, and for ever quit-claimed.'——Also, a release of a right of action which may be pleaded in bar. A release 'of all demands' discharges of all sorts of actions, rights, &c.

REL'ICS (*reliquiæ: Lat.*), in the Roman Catholic church, the remains or supposed remains of saints, martyrs, or other holy persons, or something appertaining or belonging to them, devoutly preserved in honour of their memory. At first these objects were only held in high esteem; but on the return of the crusaders from the East, relics greatly multiplied, and eventually superstition ascribed to them miraculous powers.

RELIE'F, in Feudal Law, a fine formerly paid to the king by every one who came to an inheritance of land held *in capite*, or military service.——*To relieve guard*, in military tactics, to bring fresh men for the relief of those that were on guard before.

RELIE'VO, or **RELIEF** (*rilievo: Ital.*), in Sculpture, the prominence of a figure that rises from the ground or plane on which it is formed. There are three degrees of relievo: alto, basso, and mezzo. The *alto relievo*, called also *haut-relief*, or high-relief, is that in which the figure projects according to the natural proportions. *Basso-relievo*, *bas relief*, or low-relief, is that usual on medals; and *mezzo relievo*, *demi-relief*, or half-relief, is where one half of the figure rises from the plane.

RELI'GION (*religio*, a system of divine worship: *Lat.*), any system of worship of a Being superior to man. Religion is different from *theology*, inasmuch as the latter is speculative and the former practical. Religion is a system of duties; theology a system of opinions. Theology inquires into the nature of the power or powers to whom all visible things are in subjection; religion is the sentiment which springs from that inquiry. History informs us that religion has ever had a powerful influence in moulding the sentiments and manners of men. In one region or age it has been favourable to civilization and refinement; in another it has been so directed as to fetter genius or warp the human mind. That, however, depends on the purity of the doctrine, and the liberality of its teachers.

RELIGIOUS HOUSES, different establishments or habitations for priests, still existing in Roman Catholic countries, and before the Reformation abounding in England. They consisted of abbeys, monasteries, priories, hospitals, friaries, and nunneries, supported by a vast amount of land and enormous bequests left them by zealous and wealthy individuals. Nearly the whole, more than 3000 in number, were dissolved, and their wealth seized, by Henry VIII.; the monks, nuns, and officers being allowed pensions.

RELIQ'UIÆ (*Lat.*), in Roman Antiquity, the ashes and bones of the dead, remaining after their bodies were burned, and gathered up for the purpose of being put into urns, which were deposited in tombs.

REMAIN'DER (*remaneo*, I remain: *Lat.*), in Arithmetic, what is left, when one quantity is subtracted from another. Also, what is left, when the dividend does not exactly contain the divisor. Sometimes it is an integer: thus, if 7 is divided by 3, the quotient will be 2, and 1 will be left. It is not correct to consider ⅓ also as the remainder in this case, for ⅓ is part of the quotient, since 2⅓ is the *exact* third of 7. ——*Remainder*, in law, an estate in lands, tenements, or rents, not to be enjoyed till after a term of years or another person's decease. There is this difference between a *Remainder* and a *Reversion*; in case of a reversion, the estate granted, after the limited time, reverts to the grantor or his heirs; but by a remainder it goes to some third person or a stranger. Unlike a reversion, a remainder does not arise by operations of the law, but by the act of parties.

REMINIS'CENCE (*reminiscens*, recalling to mind: *Lat.*), that faculty of the mind by which ideas formerly received into it, but forgotten, are recalled or revived in the memory.

REMIS'SION (*remissio*, a letting down: *Lat.*), in Medicine, the abatement of a disorder which does not entirely leave the patient; in distinction from *intermission*, when it goes entirely away for a time.

REMON'STRANCE (*re*, against: and *monstro*, I point out: *Lat.*), a strong representation of reasons against a measure, either public or private. When addressed to a public body, a prince, or magistrate, it may be accompanied with a petition or supplication for the removal or prevention of some evil or inconvenience.

REMON'STRANTS (same *deriv.*), in Ecclesiastical History, the appellation given to the Arminians who remonstrated against the decisions of the synod of Dort, in 1618.

REM'ORA (*Lat.*, literally, a delay; because the ancients imagined it had the power of stopping a ship by attaching itself to the rudder). In Ichthyology, the *sucking-fish*, a species of *Echeneis*.——In Surgery, an instrument for setting a broken bone.

REN'ITENCE, or **REN'ITENCY** (*renitor*, I struggle against: *Lat.*), a term formerly used in physics to express the effort of matter to resume the place or form from which it has been driven by the impulse of other matter; the effect of elasticity, or the resistance of a body to pressure.

REN'NET, or **RUN'NET** (*rinnen*, to curdle: *Ger.*), the liquor prepared by steeping the inner membrane of a calf's stomach in water; or the membrane itself. Either is used for coagulating milk, or converting it into curd in the making of cheese.

RENT (*rente*: *Fr.*, from *reditus*: *Lat.*), in Law, a sum of money issuing yearly from lands and tenements; a compensation or return, in the nature of an acknowledgment, for the possession of a corporeal inheritance.——*Rack-rent*, a rent of the full value of the tenement, or near it.——A *fee-farm rent*, is a rent-charge issuing out of an estate in fee, of at least one-fourth of the value of the lands at the time of its reservation.

RENT'AL, a schedule in which the rents of manors are set down. It contains the lands let to each tenant, with their names, and the several rents arising.

RENT CHARGE, in Law, a charge of rent upon land, with a clause of distress in case of non-payment.

RENVERS'E, (*renversé*, overturned: *Fr.*), in Heraldry, set with the head downwards, or contrary to the natural posture.

REPAND' (*repandus*, bent backwards: *Lat.*), in Botany, an epithet for a leaf, the rim of which is terminated by angles having sinuses between them, inscribed in the segment of a circle; or which has a bending or waved margin without any angles.

REPEAT' (*repeto*, I recommence: *Lat.*), in Music, a character showing that what was last played or sung must be repeated.

REPEAT'ER, a kind of watch, which, by means of a spring, is made to repeat or strike the hour.

REPEL'LENTS (*repello*, I drive back: *Lat.*), medicines which drive morbid humours from the part where they have settled; or which prevent such an afflux of fluid to a part as would raise it to a tumour.

REPENT'ANCE (*repenter*, to repent; from *peniteo*, I am sorry: *Lat.*), in a religious sense, sorrow or deep contrition for sin, as an offence and dishonour to God, and a violation of his holy law; but to render it acceptable, it must be followed by amendment of life. Repentance, excited by the fear of penalties, may exist without an amendment of life.

REP'ERTORY (*repertorium*, from *reperio*, I find: *Lat.*), a place in which things are disposed in an orderly manner, so that they can easily be found, as the index of a book, a common-place book, &c.

REPLEV'IN, in Law, a remedy granted on a distress, by which a person, whose effects are distrained, has them restored to him on his giving security to the sheriff that he will pursue his action against the party distraining, and return the goods if the taking them shall be adjudged lawful. [See DISTRESS.]

REPLICA'TION (*replicatio*, literally a folding back: *Lat.*), in Law, the plaintiff's answer to the defendant's plea. It is the third stage in the pleadings in an action. ——In Logic, the assuming or using the same term twice in the same proposition.

REPRESEN'TATIVE (*repræsento*, I make present again: *Lat.*), one who lawfully represents another for the performance of any duty, according to the wishes of the other and to his own honest judgment. A member of the house of commons is the *representative* of his constituents, and of the nation. In matters concerning his constituents only, he is supposed to be bound by their instructions; but in the enacting of laws for the nation, he is supposed not to be bound by their instructions, as he acts for the whole nation. Any other construction of his duty would be derogatory to him as a free and independent member of the senate.——REPRESENTATIVE FORMS, races or species of animals or plants in one locality which take the place of allied races or species in another locality.

REPRIE'VE (*re*, again; and *privo*, I release: *Lat.*), in Law, a warrant for suspending the execution of a malefactor.

REPRODUC'TION (*reproduire*, to reproduce: *Fr.*), in Physiology, the production, from a plant, or an animal, of a being like itself.——Also, and more properly, the power of an organized being to form anew parts which have been cut off. Some annuals possess this faculty in an eminent degree; thus, the *Hydra viridis*, or fresh water polype, when divided into many pieces, reproduces the necessary organs in each piece, so as to form from it a perfect hydra. Snails can produce new horns, and even a part of their heads; lobsters and spiders new legs: newts and lizards new tails.

REP'TILES (*reptilis*, creeping: *Lat.*), in Zoology, a class of cold-blooded vertebrate animals, all of which have lungs and a heart composed of two auricles and one ventricle. That division of reptiles which have gills during the whole or a part of their lives are placed by some naturalists in a separate class, that of amphibia. Reptiles in a zoological scale are ranked between birds and fishes. Their bodies are destitute of hair and feathers, nor do they possess teats. Muscular energy is less than that of quadrupeds, and in cold or temperate climates most of them pass the winter in a state of torpor. The smallness of their pulmonary vessels allows the aquatic species to suspend respiration, without arresting the course of the blood, and to dive with more facility, and remain under water longer than the mammalia or birds. Reptiles are either oviparous or ovoviparous; in the former case they never hatch their eggs. They may be divided into scaly reptiles and shielded reptiles, the former comprising snakes and lizards, the latter tortoises, crocodiles, and amphisbænians. In former geological ages there lived larger reptiles than any now existing. [See ICHTHYOSAURUS, IGUANODON, MEGALOSAURUS, PTERODACTYLUS, &c.]

REPUB'LIC (*respublica*: *Lat.*), in Politics, a state in which the exercise of the sovereign power is lodged in the people. If it is an *aristocracy*, like what the republic of Venice was, the authority is vested in a few privileged individuals; if a *democracy*, it is vested in rulers chosen by and from the whole population, or in representatives selected by it. Sometimes, as in Switzerland, aristocracy and democracy are combined. In modern usage it differs from a state, in which the people exercise the powers of sovereignty in person; yet the democracies of Greece are often called *republics*.——*Republic of letters*, the collective body of learned men.

REPULLULA'TION (*repullulo*, I sprout again: *Lat.*), in Botany, the act of budding again.

REPUL'SION (*repulsio*; from *repello*, I drive back: *Lat.*), in Physics, that property in bodies by which they mutually fly from each other. On account of repulsion, a fine needle will lie on water without touching it; and drops of water will roll over a cabbage leaf without leaving the least trace behind.

REQUESTS, COURT OF, in Law, an ancient Court of Equity inferior to Chancery, in which the lord privy seal was chief judge. Also the court of conscience in London, and several local courts throughout the country. But the establishment and extension of county courts, for the recovery of debts under 50*l.*, has, with few exceptions, abolished all such courts.

RE'QUIEM, in Music, a prayer in the Roman Catholic Church, which begins with *Requiem æternam dona eis Domine* (give them eternal rest, O Lord: *Lat.*); whence, 'to sing a *requiem*,' is to sing a mass for the repose of the souls of deceased persons.

RERE'DOS (*arrière*, behind; *dos*, the back: *Fr.*), in Architecture, the screen or wall behind an altar in a church; also, the back of a fireplace.

RE'SCRIPT (*rescriptus*, written in reply: *Lat.*), the answer of an emperor when consulted on some difficult question. This answer serves as a decision of the question, and is therefore equivalent to an edict or decree.

RES'CUE, in Law, the forcible retaking of a lawful distress from the distrainor, or from the custody of the law; also, the forcible liberation of a defendant from the custody of the officer.

RESERVA'TION (*reservo*, I keep back: *Lat.*), in Law, a clause or part of an instrument by which something is reserved, not conceded or granted.——*Mental reservation*, is the withholding of something that affects a proposition or statement, and which if disclosed would materially vary its import.

RESER'VE (same *deriv.*), or *Corps de reserve*, in Military affairs, the third or last line of an army drawn up for battle; so called because they are reserved to sustain the rest, as occasion requires, and not to engage but in case of necessity.

RES'ERVOIR (*Fr.*; from *same*), a place where water is collected and reserved, in order to be conveyed to distant places through pipes, or to supply a fountain, &c.

RES'IDENCE (*resideo*, I reside: *Lat.*), of clergymen, on their benefices is obligatory, except in certain cases. An incumbent is considered non-resident, if absent for one or more periods, exceeding in the whole three calendar months, in each year. Licence for non-residence may sometimes be given by the bishop; and there are statutory exceptions, in favour of several officers of cathedral and collegiate churches, &c. The penalties for non-residence are fixed on a graduated scale, depending on the value of the benefice.

RESIDEN'TIARY (same *deriv.*), a canon or other ecclesiastic installed into the privileges, &c., of residence.

RESID'UAL FIGURE (*residuus*, that remains over: *Lat.*), in Geometry, the figure remaining after subtracting a lesser from a greater.

RESID'UAL ROOT (same *deriv.*), in Algebra, a root composed of two parts or members, connected together by the negative sign.

RESID'UARY LEGATEE'. [See RESIDUE]

RESI'DUE (*Fr.*; from *residuum*, what is left behind: *Lat.*), in Law, the remainder of a testator's estate, after the payment of debts and legacies. If this residue is bequeathed to any one he is the *residuary* legatee. *A lapsed* legacy, that is one bequeathed to a person who dies before the testators, falls into the residue.

RESIL'IENCE (*recilio*, I leap back: *Lat.*), the property or act of leaping or springing back, or the act of rebounding; as, the *resilience* of a ball, or of sound.

RES'IN, or **ROS'IN** (*resina*: *Lat.*), inflammable substances exuding from trees: as the common resin, or turpentine, from Pines, mastich from the Pistacia; sandarach from the Thuya, &c. Pure resins are soluble in alcohol, and are generally separable into two portions, by acting on them with both cold and hot alcohol. They differ from *gums*, which are soluble in water, and from *gum resins*, which are partially soluble in water, and partially in alcohol. Almost all resins are translucid, not often colourless, but generally brown. When heated they melt more or less easily into a thick viscid liquid. The common resin of commerce is the solid product left after distilling turpentine.——*Resinous electricity*, is that electricity which is excited by rubbing bodies of the resinous kind, and which is generally *negative*.

RESIST'ANCE (*resisto*, I withstand: *Lat.*), or RESISTING FORCE, any power which acts in an opposite direction to another, or which prevents the effect of another power; the *resistance* of wood to a cutting instrument; that of air to the motion of a cannon-ball; or of water to the motion of a ship.——We use the term *resisting medium*, when we speak of a substance which opposes the passage of a body through it.

RESIST'ANCE OF FLUIDS. The resistance of fluids to bodies moving in them is, at least within certain limits, as the square of the velocity—that is, doubling the velocity—renders the resistance four times as great, trebling it nine times as great, and so on. It varies directly as the surfaces of bodies; that is, those which have twice as great a surface will experience twice as great resistance. And when the incidence of the resisting fluid is oblique to the surface, the resistance varies as the square of the sine of the angle of incidence. But these laws are modified by the form of the body; by the adhesion of the molecules of the fluid which is greatest, when the motion is slow; by the depth to which the body remains under the fluid, for it is sometimes more or less raised out of the fluid by the velocity of transit; moreover the pressure of the fluid increases as we descend, and by the quantity of fluid dragged along by the body, &c.

RESOLUTION (*resolutio*, literally, an untying: *Lat.*), the operation or process of separating the parts which compose a complex idea or a mixed body.——The determination or decision of a legislative body; or a formal proposition offered for legislative determination.——In Chemistry, the reducing a body to its component parts.——In Mathematics, a method by which the truth or falsehood of a proposition is discovered.——In Surgery, the dispersing of tumours.——RESOLUTION OF FORCES, in Mechanics, the dividing any force or motion into others which act in other directions; but which, taken together, shall have the same effect as the single one.

RESPIRA'TION (*respiratio*, from *respiro*, I breathe back: *Lat.*), an important function of the animal body, consisting in the alternate inhalation and exhalation of air, by which the lungs and chest are alternately dilated and contracted. Respiration changes the dark *venous* into red *arterial* blood, carbon being removed from it. Hence the oxygen of the air leaves the lungs in the form of carbonic acid. This colour will be given to blood by the atmosphere, even when it has been removed from the body; and hence, meat which when freshly cut is dark, becomes very soon of a bright red. A man breathes about twenty times in a minute, during which time he inhales about eighteen pints of air.

RES'PIRATOR (*respiro*, I breathe back: *Lat.*), an instrument made of a series of extremely thin perforated metal plates, or of fine wire, fitted to cover the mouth, over which it is fastened by bandages; its object being to warm the *inspired air*, before it enters the lungs, with the heat it received from that which was *expired*. Persons afflicted with asthmatic complaints, or lungs diseased from other causes, have received benefit from its use.

RESPOND'ENT (*respondeo*, I reply: *Lat.*), in Law, one that answers in a suit.——In the Schools, one who maintains a thesis in reply, and whose province is to refute objections or overthrow arguments.

RES'TORATION (*restauratio*: *Lat.*), renewal; revival; reestablishment. In England, the return of king Charles II. in 1660, is, by way of eminence, called the Restoration; and the 29th of May was kept as an anniversary festival, in commemoration of the re-establishment of monarchy.

RESULT'ANT, in Mechanics, a force which is the combined effect of two or more forces, acting in different directions.

RESU'PINATE (*resupinus*, bent back: *Lat.*), in Botany, reversed. A *resupinate leaf* is when the upper surface becomes the lower, by the twisting of the stalk.

RESUSCITA'TION (*resuscitatio*: from *resuscito*, I revive: *Lat.*), the restoring of persons apparently dead to life; chiefly confined to the restoring of those who appear to be dead from being immersed in water or from hanging. In the efforts made by a drowning person, or animal, to draw in air, the water rushes into the mouth and throat, which parts immediately contract in such a manner as to shut up the passage into the lungs. The contracted state continues as long as the muscles retain the principle of life, upon which the power of muscular contraction depends; when that is gone, they become relaxed, and the water enters the windpipe, and completely fills it. As soon as the body is taken out of the water, it should be stripped of any clothes it may have on, and be immediately well dried. It should then be wrapped in dry, warm blankets, or in the spare clothes taken from some of the by-standers, and be removed as quickly as possible to the nearest house, in which a fire is ready or can be made. Whatever mode of conveyance be adopted particular care should be taken that the head be neither suffered to hang backwards, nor to bend down with the chin upon the breast. When arrived at the house, the body should be laid on a mattress, or a double blanket, spread upon a low table, or upon a door supported by stools, the head and chest being elevated by pillows. The greatest aid to recovery lies in the æration of the blood, by the artificial introduction of fresh air into the lungs; for the purpose of restoring the function of respiration. After hanging, the vessels of the brain often require to be unloaded, by venesections in the jugular vein. Electricity is sometimes tried in those cases; but rarely with any effect. No time should ever be lost, nor should hope of restoring suspended animation ever be abandoned, until unequivocal signs of death appear.

RETAINER (*retenir*, to retain; from *retineo*: *Lat.*), in old English Law, a servant not employed in any particular office, but wearing the badge and livery of his master. It was a relic of the times of private warfare; and was forbidden by many statutes. The latter have been repealed, but the custom has nearly ceased.——RETAINER, or RETAINING FEE, in the language of the Bar, a fee given to counsel, to retain his services, or according to some, merely to prevent his being employed by the opposite party. It is either special or general. A *special* retainer is for a particular case; a *general*, for any case that may come on in the court which that council attends. A general retainer prevents the acceptance of a brief from the opposite party, until after twenty-four hours' notice that such a brief has been offered, when it may be accepted, if no brief or special retainer has been received from the party by whom the general retainer was paid.

RE'TE MUCO'SUM (the mucous net: *Lat.*), in Anatomy, a membrane between the epidermis and the cutis, which is one part of the skin, and the principal seat of colour in the human species.

RET'ICENCE, or RET'ICENCY (*reticentia*, literally a keeping silence: *Lat.*), in Rhetoric, a figure by which a person really speaks of a thing, while he makes a show as if he would say nothing on the subject.

RETIC'ULATE (*reticulatus*, net-like: *Lat.*), in Natural History, having distinct veins crossing like net-work; as, a *reticulate* petal or corolla.

RET'IFORM (*rete*, a net; and *forma*, a form: *Lat.*), composed of crossing lines and interstices, like a net; as, the *retiform* coat of the eye.

RET'INA (a *dim.* of *rete*, a net: *Lat.*), in Anatomy, the expansion of the optic nerve on the internal surface of the eye, where the sense of vision is first received, and of which it is the true organ.

RET'INITE, or RET'INASPHALTUM (*rētinē*, resin; and *asphaltos*, bitumen: *Gr.*), in Mineralogy, a native pitch, of a resinous appearance, and of various colours, rarely homogeneous, and often containing crystals of feldspar and scales of mica. Digested in alcohol it yields some resin, and asphalt remains; which has led some to suppose that bitumens are of resinous origin.

RETIRA'DE (*retirer*, to retire: *Fr.*), in Fortification, a kind of retrenchment in the body of a bastion or other work, which is to be disputed inch by inch, after the defences are dismantled.

RETIRED FLANK, in Fortification, a flank having an arc of a circle, with its convexity turned towards the place to be defended.

RETORT' (*retortus*, bent back: *Lat.*), a chemical vessel used in distillation. Any substance intended to be acted upon by heat being put into it, is exposed in it over a lamp, or other fire, and on being vapourized or volatilized, passes through the end into any other vessel adapted to receive it. It is of the shape of an egg placed on one end, and having its upper end drawn out into a tube, which is turned downwards. If there is a small neck for a cork, or ground glass stopper, placed at its highest part, it is termed a *tubulated retort*. It is an extremely convenient apparatus for distilling, and a great number of other purposes.

RETRAX'IT (he has withdrawn: *Lat.*), a legal term signifying a proceeding in an action by which a plaintiff withdraws from the prosecution of it. It is a bar to any future action for the same cause.

RETRENCH'MENT (*retranchement*; from *retrancher*, to intrench: *Fr.*), in the art of war, any kind of work raised to cover a post and fortify it against the enemy, such as fascines loaded with earth, gabions, sand-bags, &c.

RE'TRO (backwards: *Lat.*), a prefix to many words, as in retrocession, retrogradation, &c.; implying a going backward.

RETROCES'SION OF THE EQ'UINOXES, (*retrocessus*, a going backwards: *Lat.*), in Astronomy, the going backwards of the equinoctial points. [See PRECESSION OF THE EQUINOXES.]

RET'ROFLEX (*retroflecto*, I bend back: *Lat.*), in Botany, bent in different directions, usually in a distorted manner; as, a *retroflex* branch.

RET'ROFRACT, or RETROFRACT'ED (*retro*, backwards; and *fractus*, broken: *Lat.*), in Botany, bent back towards its insertion, as if it were broken; as a *retrofract* peduncle.

RETROGRADA'TION (*retrogradion*, I go backwards: *Lat.*), in Astronomy, an apparent motion of the planets by which they seem to go backwards in the ecliptic, and to move contrary to the order and succession of the signs.

RETURN' (*retourner*, to return: *Fr.*), in Architecture, a moulding, wale, &c., continued in a different, or opposite direction.——In Law, a certificate from sheriffs and bailiffs of what is done in the execution of a writ.——*Return days*, certain days in term time for the return of writs.——In Military and Naval affairs, an official account, report, or statement rendered to the commander; as, the *return* of men fit for duty; or the *return* of provisions, ammunition, &c.——*Returns*, in commerce, that which is received for merchandise sold.——*Returns of a mine*, in fortification, the windings and turnings of a gallery leading to a mine.

REVE'ILLE (awake: *Fr.*), in Military affairs, the beat of drum about break of day, to give notice that it is time for the soldiers to rise, and for the sentinels to forbear challenging.

REVELA'TIONS, BOOK OF. [See APOCALYPSE.]

REV'ENUE (*Fr*)., in a general sense, is an annual or continual income, or the yearly profit that accrues to a man from his lands or possessions; but in modern usage, *revenue* is generally applied to the annual produce of taxes, excise, customs, duties, &c. which a nation or state collects or receives into the treasury for public use.——The *royal revenue* is that which the British constitution has vested in the sovereign, to support the regal dignity and power. This is either *ordinary* or *extraordinary*. There was a period when the ordinary revenue of the crown was sufficient to defray the expenses of government, without recurrence to taxes; but much of this is, at the present day, in the hands of lords of manors and other subjects, to whom it has been granted from time to time by the kings of England. From this cause, the crown has become almost dependent on the people for its ordinary support and subsistence; and though at first sight it might seem desirable that now, as heretofore, the executive power were in possession of an hereditary estate and hereditary claims, adequate to the burdens of the community, without the assistance of imposts; yet the least reflection convinces us that the security of political liberty consists in the reverse. The ordinary revenue of the crown is now, as above remarked, but trifling: the *extraordinary*, which includes the whole amount of the taxes yearly voted by parliament, is that which is applied to the expenses of government, and out of which the *civil list*, or more immediate revenue of the crown, is granted. Out of the civil list are paid the salaries of the ministers, judges, &c.; and only a comparatively small part really belongs to the personal expenditure of the sovereign.

REVER'BERATORY FUR'NACE (*reverbero*, I beat back, *Lat.*), is one of such a construction that the flame is reflected or reverberated upon the bottom where the material to be acted on is placed.

REV'ERIE (*Fr.*), the wandering thoughts of a person in a dreamy frame of mind.

REVER'SION (*reversio*, a turning back: *Lat.*), in Law, is when the possession of an estate which was parted with for a time returns to the donor or his heirs. Also the right which a person has to any inheritance or place of profit, after some event; such as the decease of another.

REVET'MENT, in Fortification, a strong wall on the outside of a rampart, intended to support the earth and increase the difficulty of escalade.

REVIEW, BILL OF, in Chancery, a bill where a cause has been heard; but some errors in law appearing, or some new matter being discovered after the decree was made, this bill is given for a fresh examination into the merits of the cause.——*Review*, in Literature, a critical examination of a new publication. Also a periodical publication containing critical examinations and analyses of new works. The person who performs this duty is called the *reviewer*.——*Review*, in Military tactics, the display of a body of troops, for the purpose of exhibiting the state of their appearance and discipline before some superior officer or illustrious personage.

REVI'SE (*revisus*, seen again: *Lat.*), a second proof-sheet of a work, for the revisal or re-examination of the errors corrected.——The act of *revising* a book or writing for publication is termed a *revision*.

REVI'VOR; in the court of Chancery an abated suit may be revived by an *order of revivor*. In the courts of common law it may become necessary to revive a judgment, in which case the person entitled to execution must sue out a *writ of revivor*.

REVO'KE (*revoco*, I call back: *Lat.*), to reverse or repeal. A law, decree, or sentence is revoked by the same authority which enacted or passed it. A devise may be *revoked* by the devisor, a use by the grantor, and a will by the testator.——A law may cease to operate without an express *revocation*.——To *revoke* at cards is not to play to suit when it is possible to do so; to play a trump, for instance, at whist, instead of the suit which was led, when the player has some of that suit in his hand.

REV'OLUTE (*revolutus*, rolled back: *Lat.*), in Botany, rolled back or downwards; as, *revolute* leaf, when the sides of the leaf in the bud are rolled spirally back or towards the lower surface.

REVOLUTION (*revolutio: Lat.*), in Politics, a material or entire change in the constitution of government. Thus the *revolution* in England, in 1688, consisted in the abdication of king James II., the establishment of the house of Orange upon the throne, and the restoration of the constitution to its primitive state. In like manner, though with very different consequences, the *revolution* in France in 1792 effected an entire change of constitution: *Revolution*, in Physics, the circular motion of a body on its axis; as, the *revolution* of a wheel, &c.——*Revolution*, in Astronomy, the motion of any heavenly body in its orbit until it returns to the same point again.

REX SACRO'RUM (king of sacred things: *Lat.*), among the Romans, a person appointed to preside in certain sacred duties. He generally performed such office as the kings of Rome were supposed to have reserved to themselves, before the abolition of their power. He was chosen, at the command of the consuls, by the college of Pontiffs; and inaugurated by the Augurs. The office was instituted at the establishment of the commonwealth, that the name of king might not be wholly extinct; and he was not permitted to have the least share in civil affairs.

RHAP'SODY (*rhapsōdia;* from *rhapto*, I sew together; and *ōdē*, a song: *Gr.*), a collection of passages, composing a new piece; but without necessary dependence or natural connection.

RHE'IN, an inodorous, bitterish matter, obtained by gently heating powdered rhubarb with nitric acid of a certain strength; evaporating to the consistence of syrup, and diluting with water.

RHET'ORIC (*rhētorikē:* from *rhētōr*, a public speaker: *Gr.*), the art of speaking with propriety, elegance, and force; or, as Lord Bacon defines it, the art of applying and addressing the dictates of reason to the fancy, and of recommending them there so as to affect the will and desires. Rhetoric and oratory differ from each other as the theory from the practice; the rhetorician being the one who describes the rules of eloquence, and the orator he who uses them to advantage. The parts of rhetoric are, *invention*, *disposition*, and *elocution*. The forms of speech by which propriety and elegance are produced are denominated *tropes* and *figures*. The general manner in which the orator employs his words for the formation of his speech is called *style*, which is variously distinguished. Rhetoric divides an oration or speech into five parts; the Exordium, Narration, Confirmation, Refutation, and Peroration. The *Exordium* is the part in which the speaker prepares the minds of the auditors for what he is about to advance. It ought to be expressed with considerable care and perspicuity, and the matter and manner should be to the purpose, brief, and modest. The *Narration* is the recital of facts or events; and should have the qualities of clearness, probability, brevity, and consistency. The *Confirmation* establishes the proofs of a discourse, and arranges them in the manner best adapted to enforce conviction. The *Refutation*, or anticipation, furnishes arguments to answer the assertions that may be opposed to the narration. The *peroration*, or conclusion, should recapitulate the whole with condensed force and energy.

RHEUM (*rheuma: Gr.;* from *rhes*, I flow), in Medicine, an inflammatory action of the mucous glands, attended with increased discharge and an altered state of their secreted fluids.——*Rheum* (*rheo*, I flow: *Gr.*, because it causes purging), in Botany, a genus of plants inhabiting Asia and Africa.

RHEUM'ATISM (*rheumatismos;* from *rheuma*, a catarrh: *Gr.*), in Medicine, a painful disease affecting the muscles and joints of the body, chiefly the larger joints, as the hips, knees, shoulders, &c. It may arise at all times of the year, when there are frequent vicissitudes of the weather, from heat to cold; but the spring and autumn are the seasons in which it is most prevalent. It is sometimes accompanied by fever, in which case it constitutes *acute rheumatism* or *rheumatic* fever; the joints are then much swollen and very painful. In this form of the disease its translation to the heart is not unusual.——*Chronic rheumatism*, leads occasionally to permanent distortions of the joints; and affects the periosteum, tendons, and ligaments; it is most common when the health has been broken by previous disease, or over exertion of body or mind.

RHINO'CEROS (*rhin*, a nose; and *keras*, a horn: *Gr.*), in Zoology, a genus of pachydermatous mammalia. The rhinoceros is only exceeded in size by the elephant; its nose is armed with a horny substance, which projects, in the full grown animal, from two to three feet, and is a weapon of defence that secures him from almost every attack. Even the tiger, with all his ferocity, is but rarely daring enough to assail him. The skin of the rhinoceros is in some parts so thick that it is scarcely penetrable by the sharpest sabre or even a musket-ball. He is not ferocious unless provoked, runs with great swiftness, and rushes through brakes and woods with an energy to which everything yields. The rhinoceros delights in retired places near lakes and streams, and appears to derive one of his greatest pleasures from rolling in the mud. The African rhinoceros has two horns.

RHINO'CEROS-BIRD, in Ornithology, a bird of the genus *Buceros*, having a reverted horn of large size attached to the base of the upper mandible.

RHIZOM'E (*rhizoma*, that which has taken root: *Gr.*), in Botany, a rootstock, a horizontal stem more or less under ground, which sends out roots from its under side, and leaf buds from its upper side.

RHO'DIUM (*rhodon*, a rose: *Gr.*, from the colour of some of its salts), in Mineralogy, a metal discovered among the grains of crude platinum by Dr. Wollaston. It is of a whitish colour; when pure is brittle, and requires a much higher temperature for its fusion than any other metal, unless perhaps iridium. It readily alloys with every other metal, except mercury, and is insoluble in all acids. Certain of its alloys are, however, soluble. Its spec. grav. is about 11.

RHODODEN'DRON (*rhodon*, a rose; and *dendron*, a tree: *Gr.*), in Botany, a genus of shrubs, nat. ord. *Ericaceæ*, which have their head-quarters in North America and the Himalayas.

RHO'DONITE (*rhodon*, a rose: *Gr.*), a mineral of a reddish hue and splintery fracture, occurring compact or fibrous in parts of Germany. It is a silicate of manganese.

RHOM'BOID (*rhombos*, a rhombus; and *eidos*, form: *Gr.*), in Geometry, a quadrilateral figure whose opposite sides and angles are equal, but which is neither equilateral nor equiangular.

RHOMB-SPAR, a mineral of a grayish white colour, and crystallized in rhomboids; occurring massive, and imbedded in chlorite slate, limestone, &c. It consists chiefly of carbonates of lime and magnesia.

RHOM'BUS (*rhombos: Gr.*), in Geometry, an oblique angled parallelogram, or a quadrilateral figure whose sides are equal and parallel two and two: but the angles unequal, two of the opposite ones being obtuse, and two acute.——RHOMBUS, in Ichthyology, a genus of flat fishes including the turbot, brill, and whiff.

RHOPAL'IC VERSES (*rhopalon*, a club:

Gr.), are verses each line of which begins with a word of one syllable; then comes a word of two syllables, then a word of three, and so on to the end.

RHU'BARB (*rha barbara*, foreign rheum: *Gr.*), a valuable medicinal root growing in China, Turkey, and Russian Tartary, of which that from Turkey is the most esteemed. It is the produce of plants belonging to the genus *Rheum*, of which the species are numerous; as the palmated or true Chinese rhubarb; the compact or Tartarian; the undulated, or waved-leaf Chinese rhubarb; and the currant rhubarb of Mount Libanus. There is also a well-known species cultivated in our gardens.

RHUMB, a circle on the earth's surface, making a given angle with the meridian of the place, and marking the direction of an object through which it passes.——Also, one of the divisions on the compass card.

RHUMB LINE, in Navigation, the track of a ship, which cuts all the meridians at the same angle. It is called, also, the *Loxodromic curve*. Being the simplest curve, it is the route usually pursued at sea; but a ship sailing on it never looks direct for her port until it comes in sight.

RHUS (*rous: Gr.*), in Botany, a genus of plants, nat. ord. *Anacardiaceæ*, including the sumach and the Japanese varnish tree.

RHYME (*rhuthmos*, literally a measured motion: *Gr.*), in Versification, the correspondence of sound between the last syllable or syllables of one verse, and the last syllable or syllables of a verse succeeding immediately, or at no great distance. To constitute this correspondence in single words or in syllables, it is necessary that the *vowel* and the *final* articulations or consonants, should be the same, or have nearly the same sound. The *initial* consonants may be different, as in *hope* and *rope*, *live* and *give*, &c. When only the last syllables correspond it is a *male rhyme*; when the two last, it is a female rhyme; when the three last, it is an Italian form of rhyme, termed *sdrucciolo*—never allowed in English, except in burlesque poetry. In Arabian and Persian poetry, the correspondence sometimes extends through the entire lines. When the consonants of the last syllables are identical, the rhyme, in English, is faulty. Two syllables may rhyme, though spelled very differently, thus *woo*, and *pursue*; and two syllables may not rhyme, though spelled the same way, thus *gone* and *alone*.

RHYTHM (*rhuthmos: Gr.*), the consonance of measure and time, in poetry, prose, music, and even in dancing. Each verse or period is to be considered as a whole; within which, with certain limited variations, the rhythm is perfect. The parts which are to receive the stress are termed *arsis* (elevation), and the remainder constitute the *thesis* (depression). The former, particularly in words whose pronunciation may not be known, is often remarked by an '. A long syllable should have double the time of a short one. The poetical rhythm requires a succession of motions of regular duration, which, variously interrupted, must yet be obvious, and combined so as to form an harmonious whole.

RI'AL, a gold coin which was current in the reign of Henry VI. for 10*s.*, and in that of Elizabeth for 15*s.*

RIB (*ribbe: Sax.*), in Anatomy, a bone which forms a part of the frame of the thorax. In the human body there are twelve ribs on each side, proceeding from the spine to the sternum, or towards it, and serving to inclose and protect the heart and lungs. In the language of comparative anatomy, the ribs are the pleurapophyses of the centrum. In man, only seven of them form a complete hoop, by connecting the centrum with the hæmal element, the breast bone or sternum.——In Naval Architecture, a piece of timber which forms or strengthens the side of a ship.——In Botany, the continuation of the petiole along the middle of a leaf, and from which the veins branch out.

RIB'BON (*ruban: Fr.*), a narrow web of silk, worn either as a badge or as an ornamental part of dress. Ribbon-weaving is an important branch of manufacture, giving employment to numerous hands, and displaying much taste and skill. Coventry is the chief seat of the ribbon manufacture.——RIBBON, in Naval Architecture, a long narrow flexible piece of timber, nailed upon the outside of the ribs, from the stem to the sternpost, so as to encompass the ship lengthwise.

RICE (*oryza: Lat.*), a cereal plant, the fruit of which forms an article of very extensive consumption. It is cultivated in many parts of Europe, and in most warm countries throughout the world. With the husk on the grain, it is called *Paddy*. The plant belongs to the order of grasses, and is the *Oryza sativa* of botanists. Some varieties are grown on moist soils, others on mountain slopes.

RICE PAPER, a material employed for various fancy articles, is the pith of a water plant growing in China, the *Aralia papyrifera* of botanists, belonging to the nat. ord. which includes our common ivy. The pith is cut round and round from the outside towards the centre with a sharp knife, and it is then made flat by pressure. The name originated in a mistake

RICK'ETS, or RACHI'TIS (*rachitis*, from *rachis*, the spine: *Gr.*, the part chiefly affected), in Medicine, a disease which affects children, and in which the joints become knotted, and the legs and spine grow crooked. It appears to arise from a deficiency of the salts of lime in the bones, and is frequently symptomatic of a scrofulous state of the glands and viscera. It sometimes disappears to a great extent, as the growth advances. Where the bones are inclined to bend, the weight should as much as possible be kept off of them.

RICO'CHET FIRING, in Gunnery, the firing of guns, mortars, or howitzers with small charges, and elevated a few degrees, so as to carry the balls or shells just over the parapet, and cause them to roll or slightly rebound along the opposite rampart. The term *ricochet* is derived from the French, and signifies the bounding of a ball along the mound which it strikes at intervals.

RIDE, a term made use of in a variety of senses with reference to a ship's position or motion

RIDEAU' (a curtain: *Fr.*), in Fortification, a rising ground commanding a plain; also a trench covered with earth in form of a parapet, to shelter soldiers.

RI'DER, or **RI'DER-ROLL**, in Law, a schedule, or small piece of parchment, often added to some part of a record or act of parliament.

RI'DING (corrupted, according to Blackstone, from *trithing*, third), one of the three jurisdictions into which the county of York is divided; anciently under the government of a reeve.

RIDOT'TO, (literally, a retreat: *Ital.*), a favourite amusement in Italy, consisting of music and dancing.

RIFACIMEN'TO, (reestablishment: *Ital.*), a remaking or furbishing up anew. Its most usual application is to the process of recasting literary works, so as to adapt them to a somewhat different purpose, or to a changed state of circumstances.

RI'FLE, a gun having several spiral grooves or channels cut in the barrel. The object is, to give the ball a rotatory motion, about the axis of progression; which prevents any inconvenience from irregularity in the position of its centre of gravity, or from its friction against only one side of the gun. Such friction would make the ball revolve, so as to have its path seriously *deflected*, and in a direction which could not be provided against, in taking aim, as it could not be previously known at what side its friction would occur. Various forms have been recently given to the ball, to facilitate and steady its passage through the air, and to cause expansion against the surface of the grooves, so as to fill them more perfectly &c. The *Enfield rifle* has three spiral grooves; its bullet is *cylindro-conoidal*, and has recessed into its back end a tapering piece of box, which being forced by the explosion farther into the bullet, causes the sides of the latter to expand, until the lead completely fills the grooves at their breech ends. With the *Minie rifle*, a *cylindro-conic* bullet, which easily enters the barrel, is used; it has a conical opening behind, into which a little cup of sheet iron is driven by the explosion so as to press the lead forcibly into the grooves. Circular channels round the outside, at the back or larger end, were supposed to steady the flight; but when our government adopted this rifle, they were discarded, not only as of no use, but as actually lowering the velocity; also, the bullets were rendered of more uniform density, and therefore less likely to deviate from the proper direction, by being made mechanically instead of being cast. Other kinds of rifled firearms have been invented. And cannon balls are propelled from rifled artillery with a certainty of aim, a power, and a range far exceeding anything attained in former times. Indeed, such have been the the late improvements, that the mode of carrying on war, particularly at sea, is being entirely remodelled. Thus, on account of the alterations made in artillery, and those in the construction of steam vessels, the finest ships of an older construction have been rendered almost worthless; and the navy, with all its equipments, has to be created anew.

RI'GEL, a star of the first magnitude in the constellation Orion; the *β Orionis* of astronomers.

RIG'GING, the ropes belonging to a ship, by which the masts are sustained and ascended, and the sails managed. The *rigging* is of two kinds, *standing* rigging, as the shrouds and stays, and *running* rigging, as braces, sheets, halliards, &c.

RIGHT (*rigt: Sax.*), in Geometry, sometimes means straight; as, a *right line*, but, more generally, it is opposed to oblique; thus, a *right angle* is one formed by two lines meeting perpendicularly; a *right prism*, one whose sides are perpendicular to the base.——*Right ascension*, in Astronomy, the angle at the pole of the equator, formed by two great circles, one of which passes through the first point of Aries, and the other through a celestial body; and measured, therefore, by the arc of the equator intercepted between these circles. *Right ascension* and *declination* are the two coordinates, to which the positions of heavenly bodies are referred.——*Right sphere*, in Geography, the position of the sphere, when the equator cuts the horizon at right angles.

RIGID'ITY (*rigiditas*, stiffness: *Lat.*), in Mechanics, resistance to a change of form. The rigidity of cordage causes the effective and the calculated mechanical effects to be extremely different

RIMO'SE (*rimosus*, full of cracks: *Lat.*), a zoological term, denoting that the surface of any part possesses numerous minute narrow excavations, running into each other, so as to resemble the bark of a tree.

RIN'FORZANDO (strengthening: *Ital.*), or *crescendo*, in Music, a direction given to the performer, that the sound is to be increased This is indicated also by an angle, having its point turned to the left; the *Diminuendo*, or opposite change, being represented by an angle turned in the opposite direction.

RING-BONE, in Farriery, a callus growing in the hollow circle of the little pastern of a horse, just above the coronet.

RING'DOVE, the largest of the European species of pigeons. [See DOVE.]

RIN'GENT (*ringor*, I open the mouth wide, to show the teeth: *Lat.*), in Botany, an epithet applied to an irregular monopetalous labiate corolla, when the upper lip is arched, and a distinct gap separates it from the lower lip

RING'WORM, in Medicine, a disease which appears in circular patches on the neck, forehead, or scalp. It begins with clusters of little pustules, which form scales, leaving a red pimply surface, and destroying the roots of the hair as it spreads over the head. It is very contagious, and is so capricious that what will effect a cure in one case is found quite ineffective in another.

RI'OT, in a general sense, means a tumultuous assembling of three or more persons, who do not disperse upon proclamation.——*Riot Act*, an act of parliament prohibiting riotous or tumultuous assemblies, which being read by a magistrate or peace officer to the mob, obliges all persons to disperse within an hour, on pain of being apprehended as rioters.

RIPO'SO (*Ital.*), a name given in art to the subject of the Holy Family resting on the way during their flight to Egypt.

RITE (*ritus*: *Lat.*), a formal act of religion or other solemn duty; the manner of performing divine service as established by law or custom.

RITORNEL'LO (a return: *Ital.*), in Music, a short repetition, such as that of an echo or the last words of a song; particularly, if it is made after a voice by one or more instruments. It is, however, a term now used to express all symphonies, played before the voices begin, and seeming to prelude or introduce what follows.

RIT'UAL (*ritualis*, relating to religious rites: *Lat.*), a book containing the rites, or directing the order and manner to be observed in celebrating religious ceremonies, and performing divine service in the church.

RIV'ERS (*rivus*, a brook: *Lat.*), large streams of water flowing through channels, or low parts of the surface of the earth, and pursuing their course towards the sea. They have from the very infancy of civilization been always considered of the highest importance, as a means of fertilizing the land; and effecting an easy communication between different regions. Hence they were deified, and held in the greatest veneration, by the ancients; and their importance has been greatly increased in modern times, on account of the facilities for navigating them afforded by steam. Most large rivers have their sources in mountains, or high table lands; and nearly all are higher at one part of the ocean than others. This swelling generally happens in winter; but when it is due to the melting of the snows, as in those rivers which have their origin in very lofty mountains, it takes place towards the autumn. The time at which it occurs is modified also by the period at which rainy seasons happen. These, within the tropics, begin about the time the sun passes the Meridian towards the tropics; and continue till his return to the same place. No river has been so celebrated for the regularity and importance of its annual increase as the Nile. On its inundation has ever depended whether there should be the greatest abundance or the most disastrous famine in Egypt. The largest rivers in the world are the Amazon and La Plata, in South America; the Mississippi, Missouri, and St. Lawrence, in North America; the Kian Kiou, the Hoanho, the Lena, the Ganges, the Indus, and the Euphrates, in Asia; the Nile, in Africa; and the Volga, the Danube, and the Rhine, in Europe. Many of the largest rivers mingle with the sea by means of a single outlet, while others before their termination divide into several branches. This circumstance will depend upon the nature of the soil through which a river flows. A *delta*, of greater or less magnitude, is found at the mouth of most rivers; it arises partly from the water becoming comparatively still, on account of the meeting of the tidal current and the river; and partly from the diminished velocity due to increase in width; both which cause the matters mechanically suspended in the waters, or rolled forward by it, to come to a state of rest, and, in certain circumstances, to accumulate so as to form patches of dry land, which thus multiply the channels by which the river discharges itself into the sea. In this way, the mouths of the Nile were formed, and have been multiplied even within the period of historical record. The earth, gravel, &c., which is thus deposited, is naturally shaped by the current at each side of it into a *Delta*, or Greek Δ, that is, a triangle whose vertex points up the stream. The following are the lengths of some of the most important rivers.

	Miles.
EUROPE.	
The Thames	180
The Rhine	810
The Danube	1750
ASIA.	
The Euphrates	1750
The Ganges	1800
The Kang-tse, in China	3870
AFRICA.	
The Nile	2330
AMERICA.	
The Mississippi	3420
The St. Lawrence, including the Lakes	4050
The Amazon, not including the Araguay	4095

RIX-DOL'LAR (a corruption of *reichsthaler*, a dollar of the empire: *Germ.*), a silver coin in Germany, Denmark, and Sweden; it is of different values in different countries. In Prussia it is worth about 3s.

ROACH (*reohche*: *Ang. Sax.*), the *Leuciscus rutilus* of Ichthyologists, a river fish belonging to the carp family, and known by the red colour of its pectoral, ventral and anal fins.——Also, the curve or arch generally cut in the foot of some square sails, from one clue to the other, to keep them clear of stays and ropes.

ROADS (*rad*: *Sax.*) for wheeled carriages are now principally made by stones, broken up into small pieces, and bound together with the earth, which is called macadamizing, from the name of the person with whom the plan originated. The formation of good roads gives the greatest facility to commerce, and contributes in an eminent degree to the progress of civilization; for wherever the means of internal communication are deficient the people are ill supplied with many of the necessaries, as well as the luxuries, of life. The Romans were so well acquainted with the importance of good roads that, on subduing a country, the first care was to furnish it with a mode of communication between its different parts

They considered this indispensable, even in a military point of view. Hence many vestiges of their roads are found in the most distant portions of their empire; and some remains of them in this island, even at the present day. Their labours and skill in this department would bear comparison with the greatest efforts of modern times. It is only recently that good roads have been constructed in this country, or that their advantages were appreciated; in 1763 there was but one coach between Edinburgh and London; it started once a month from each place, and took a fortnight to perform the journey. Though good roads are still of great utility, the construction of railways has diminished their importance.——ROAD, or ROADSTEAD (*rade: Fr.*), a place fit for anchorage, at some distance from the shore.

ROAST'ING (*rosten*, to roast: *Germ.*), in Metallurgy, the separation of volatile bodies from those which are more fixed, by the combined action of air and fire; and is generally the first process in the reduction of metals. The ores are kept for some time at a temperature below their fusing points, which drives off the sulphur, arsenic, carbonic acid, water, &c.

ROBIN'IA, a genus of handsome leguminous trees and shrubs, mostly deciduous and natives of North America. Some of the species are well known on our lawns, under the erroneous name of acacia.

ROC'AMBOLE, the *Allium scorodoprasum* of botanists, a wild garlic, with a purple flower, a native of Denmark. Cultivated forms of it are eaten.

ROCHEL'LE SALT, the popular name of the tartrate of potash and soda; it is employed as a purgative, being one of the ingredients of seidlitz-powder.

ROCH'ES MOUTONNES (*Fr.*), in Geology, a term for protuberances of hard rock with a smooth rounded or dome-shaped outline, such as are seen on the borders of glaciers.

ROCH'ET (*Fr.*), a kind of surplice worn by dignitaries in the Roman Catholic church; at mass the alb is placed over it.

ROCK. Geologists give the name rock to those distinct mineral masses which form the crust of the globe, whether composed of hard or soft materials, clay and sand being included in the term. With reference to their origin rocks may be classed as:—1. Aqueous or sedimentary, the result of deposition in water These are stratified, that is arranged in layers or beds, and most of them are fossiliferous. 2. Volcanic rocks, those that have been produced at the surface of the earth by the action of subterranean heat. BASALT and TRACHYTE belong to this class. 3. Plutonic rocks, those that have been produced by subterranean heat deep within the earth and under great pressure, such as GRANITE and SYENITE. Metamorphic rocks, those that were originally sedimentary, and still retain more or less the marks of stratification, but have been made to assume a crystalline structure by the action of heat. To this type belong GNEISS and mica schist. The rocks of the last two classes seldom contain fossils, and those of the second only occasionally and by accident. Rocks may be studied palæontologically, that is with reference to the organic remains imbedded in them; or lithologically, that is with reference to their mineral structure. [See GEOLOGY.]

ROCK-CRYS'TAL, in Mineralogy, one of the forms of quartz consisting, when pure, entirely of silica, but frequently coloured with other matter. Its most usual form is that of hexagonal prisms, surmounted by hexagonal pyramids.

ROCK'ET (*rochetto: Ital.*), in Pyrotechny, an artificial firework, consisting of a cylindrical case of paper, filled with a composition of combustible ingredients. This being tied to a stick and fired, ascends into the air and bursts, presenting a shower of stars, coloured according to the nature of the composition. [See CONGREVE ROCKET, and PYROTECHNY.]——ROCKET, the popular name of ornamental plants, belonging to the genus *Hesperis*, nat. ord *Cruciferæ*.

ROCK'ING-STONES, called also *Loggan* or *Laggan stones*. There are several of these among the picturesque barriers of the British coast. They consist of an immense mass, with a slightly rounded base resting on a flat surface of rock below, which is so nearly balanced, that an individual can move or rock it. These stones have been variously accounted for by antiquarians, and there are many traditions connected with them

ROCK'-SALT, fossil or mineral salt, dug from the earth. [See SALT.]

ROD (*ræde: Belg.*), a measure of length, containing 5½ yards, or 16½ feet. In many parts of England the word *Rod* is universally used for *Pole* or *Perch*: four rods make a *Gunter's chain*.

RODENTS (*rodo*, I gnaw: *Lat.*), or *Glires*, an order of clawed mammals. They have two long chisel-shaped incisors in each jaw; between the incisors and molars there is a vacant space without canines, and the lower jaw is so articulated as to allow a horizontal motion only from back to front. To this order belong the beaver, hare, squirrel, rat and porcupine.

RO'EBUCK, in Zoology, the *Capreolus capræ*, a species of deer with erect cylindrical branched horns, forked at the summit. This animal is remarkable for its elegant shape and activity; is one of the smallest of the cervine genus: and, like the goat, prefers a mountainous country. It was formerly common in our island.

ROGA'TION (*rogatio*; from *rogo*, I ask), in the Roman jurisprudence, a demand made by the consuls, or tribunes of the people, when a law was proposed to be passed.——*Rogatio* is also used for the decree itself made in consequence of the people giving their assent to this demand, to distinguish it from a *senatus consultum*, or decree of the senate.

ROGA'TION DAYS (same *deriv.*), the Monday, Tuesday, and Wednesday next before Ascension-day. The public supplications, or litanies, were anciently termed *rogations*.

ROGUES' YARN, a yarn of a different twist and colour from the rest, inserted in the royal cordage, to render its identification easy if stolen.

ROLL (*role: Fr.*), an official writing; a list, register, or catalogue; as a muster *roll*, a court *roll*, &c.——In Law, a schedule of parchment, that may be turned up with the hand, in the form of a pipe. All pleadings, memorials, and acts of court are entered on rolls; and being filed with the proper officers, become records of the court.——**ROLL CALL**, the calling over the names of the men who compose any part of a military body. ——**ROLLS OF PARLIAMENT**, the manuscript registers, or rolls of the proceedings of our ancient parliaments; which, before the invention of printing, were all engrossed on parchment, and proclaimed openly in every county. In these *rolls* are also contained decisions of points of law.

RO'LLER, the *Coracias garrula* of ornithologists, a handsome African bird allied to the bee-eaters and kingfishers, which sometimes finds its way into Britain. Great numbers cross the Mediterranean into Europe in the spring, and return to Africa in the autumn.——**ROLLER**, a piece of wood, iron, brass, &c. of a cylindrical form, used in the construction of several machines, both in husbandry and the arts.——In Surgery, a long and broad bandage, usually of linen cloth, to be rolled round any part of the body.——A name given by seamen to unusually heavy waves that set on a coast without wind.

RO'LLING-MILL, a machine for working metals into plates, or bars which are required of an even thickness. Rolling-mills are chiefly used for drawing out iron bars after they have been manufactured into bar iron by the forge hammer.

RO'LLING-PRESS, in Mechanics, an engine consisting of two cylinders, by which cloth is calendered, waved, &c.——A machine or press for taking impressions from steel or copper-plate engravings. There are also a variety of rolling-presses used in other branches of manufacture.

ROLLS, MASTER OF THE. [See MASTER.]

ROMA'IC, the language of modern Greece.

RO'MAN, a member of the Christian church at Rome, to which St. Paul addressed an epistle; and which consisted of converts from Judaism or Paganism.——In Literature, the ordinary printing character now in use, in distinction from the *Italic*.

RO'MAN CATH'OLICS, that society of Christians whose members acknowledge the pope as visible head of the church. [See CATHOLIC.]

ROMAN'CE (*roman: Fr.*), in Literature, a tale or fictitious history of extraordinary adventures. The *Romance* differs from the *Novel*, as it treats of great actions and extravagant adventures, soaring beyond the limits of fact and real life. [See NOVEL.] Romances have of late years given way to *historical novels*; and even such as are occasionally published are very different from those of the olden time.

ROMAN'CE LAN'GUAGES. These are the modern languages derived from the ancient Roman or Latin. They are six in number, the languages of Spain, Portugal, France, Italy, Wallachia, and the Swiss Grisons. These are all corrupt forms of Latin mingled with many words of the ancient dialects of the country. [See PROVENÇAL.]

ROMANES'QUE, in Architecture, a style that arose in the north of Italy about the tenth century, to which the East contributed the cupola and the symbol of the cross, whence it is sometimes termed Byzantine. In the Rhine country, at a later date, various modifications were made. A spire was added, but the apse was retained, and round-headed arches continued to be used. There are many beautiful specimens of this style at Cologne, Bonn, and other Rhenish towns.

RON'DEAU (*Fr.*), a species of poetry, usually consisting of thirteen verses: of which eight have *masculine* and five *feminine* rhymes, or *vice versâ*. [See RHYME.] The two or three first words of the first verse serve as the burden, and recur in that shape after the eighth and thirteenth verses.

RON'DO, in Music, either vocal or instrumental. This generally consists of three strains; the first of which closes in the original key; while each of the others is so constructed as to reconduct the ear in an easy and natural manner to the first strain. It is sometimes spelled *Rondeau*.

ROOF (*hrof: Sax.*), in Architecture, the timber-work which sustains the slates, tiles, lead, &c., that form the coverings of buildings. The elevation of a roof depends on the climate; the more northern the country the greater its pitch should be. It is supposed that, considering the inclination of a roof at the equator to °, or *Zero*, we may add three degrees of inclination for every climate, that is, every 2° 42′ 30″ of latitude, and this gives very nearly the inclinations used by the ancients in different places. In its simplest form it consists merely of two *rafters*, whose lateral thrust against the walls on which they rest is counteracted by tying them together with a *collar*, placed some way up the lengths; and if necessary, by a *tie beam* placed at their feet. Beyond certain lengths it is clear that the tie beam itself will have a tendency to sink down in the middle; it must then be suspended at its centre, from the junctions of the rafters, by a *king post*. If the rafters are long, they also have a tendency to sink in the middle; which must be prevented by *struts*, or oblique pieces, abutting against the sides of the lower extremity of the king post. The whole now would form a frame called a *truss*. Sometimes the upper ends of the rafters, instead of abutting against each other, abut against the extremities of a horizontal piece, called a *collar*, which is placed between them, to keep them apart. Instead of the king post there are then two vertical pieces, called *queen posts*, which hang from the extremities of this collar, and support, at their lower ends, struts tending in various directions, for the sustaining of various points. *Purlines* are strong pieces placed across the principal rafters to steady them, and to support the *common* rafters, which are fixed at the ordi nary small distances apart. Some roofs are very complicated and ingenious; but the principles on which they are constructed can always be easily understood, from what has been said. When sufficiently long beams cannot be obtained in one piece, two or more pieces are *scarfed* together; that is, their extremities are entangled in each other, by the way they are cut and notched; and they are kept together by iron bolts. The various parts of a frame roof, also, are kept united by iron straps and bolts.

ROOK (*hroc: Ang. Sax.*, the *Corvus frugilegus* of ornithologists, a bird that differs from the crow by his gregarious habits, in feeding on insects and grain, not carrion, and in having the base of the bill covered with a rough scabrous skin, the latter however being the result of the bill being thrust into the ground in search of worms and larvæ. Rooks are very destructive of corn, especially of wheat; and it behoves the husbandman to keep a watchful eye on his newly-sown fields; for if neglected three or four days, when the blade first appears, a good crop may be destroyed in embryo; the good they do, in destroying grubs and noxious insects, is supposed greatly to exceed the mischief.

ROOT (*rot: Goth.*), in Botany, that part of a plant which is under ground and serves to support it in an erect position; while by means of its fibrils it imbibes from the earth a nourishment which ascends to the stem, branches, and fruit.——*Root*, in Arithmetic, a number or quantity which, multiplied by itself, produces a higher power: thus, 2 is the square root of 4, and the cube root of 8.

ROPE (*rap: Ang. Sax.*), a large kind of cordage, formed by the twisting of several strands of yarn together; the smallest sort of rope is called *Cord*, and the larger kinds *Cable*. Large ropes are distinguished into two main classes, viz. the *cable-laid* and *hawser-laid*. The former are composed of nine strands, while the latter consist only of three. Ropes of from one inch to two inches and a half in circumference are usually hawser laid; those from three to ten inches, are either hawser or cable-laid; but when more than ten inches, they are always cable-laid.——*Rope making*, the process of twisting yarn into ropes, by means of a wheel or other machinery.——*Rope-walk*, a long covered walk, or a long building where ropes are manufactured.

RORQUAL, the *Balænoptera rostrata* of zoologists, a marine mammal allied to the whales, and the largest of living animals. The throat and belly are wrinkled with deep folds of skin. As the rorqual yields little oil it is not sought after by whalers.

ROSA'CEÆ (*rosa*, a rose: *Lat.*), a natural order of exogenous polypetalous plants, consisting of herbs and shrubs. Amongst British wild plants the dog rose, bramble, strawberry, potentilla, agrimony, and meadow-sweet belong to this order, which may be recognised by the five petals, the numerous stamens arising from the calyx just within the petals, and the superior ovary.

RO'SARY (*rosarium*, a rose garden: *Lat.*), in the Roman Catholic church, a string of beads, or a chaplet consisting of five or fifteen decades of beads. It is used for counting the *Ave Marias*, or prayers addressed to the Virgin Mary: one *paternoster*, or Lord's prayer, is said for every ten *ave Marias* or hail Mary's. The chaplet is considered to contain only five decades, the *rosary* fifteen; but this distinction does not seem to be always observed. Other sects also use chaplets, for counting repeated prayers. [See CHAPLET.]

ROSE (*rosa, Lat.*), in Architecture, an ornament cut in the form of that flower, chiefly used in cornices, friezes, vaults of churches, &c., and particularly in the middle of each face in the Corinthian abacus.——*Rose*, the flower of plants belonging to the botanical genus *Rosa*, of which many species are in cultivation. A great number of varieties have been produced by crossing the species. The ancient poets say, that the first rose was brought into the world by the hands of the god of love; and the occasion was, a desire to bribe Harpocrates, the god of silence, to an engagement that he would discover none of the secrets of Venus. Hence it became a custom to place a *rose* in rooms devoted to mirth and entertainment, as a symbol in the presence of which all restraint might be laid aside; accordingly the proverb '*under the rose*,' denotes secrecy and inviolable silence. The rose is also from the same cause the direct *emblem* of silence. Besides being used at the feasts and convivial meetings of the ancients, the rose was frequently laid upon the tombs of the dead: either to signify the silence of death, or an offering grateful to the deceased.——*Rose*, in Politics, a badge of distinction formerly assumed by the houses of York and Lancaster, the former of whom took the white rose, and the latter the red. On the union of the two houses by the marriage of Henry VII. with Elizabeth, daughter of Edward IV., the two roses were united in one, which became the royal badge of England.——ROSE OF JERICHO, the name of a cruciferous plant, the *anastatica hierochuntina* of botanists, the withered stems of which roll up into a ball during the dry season, and are blown about the deserts of Syria for years, only unfolding in a time of rain.

RO'SEMARY (*rosmarinus*, literally seadew: *Lat.*), an evergreen shrub of the genus *Rosmarinus*, nat. ord. *Labiatæ*. It is a native of the maritime districts of the Mediterranean. The flowers are of a dull leaden hue, or even white. It is used in an infusion, as a remedy for the headache; and is employed in the manufacture of Hungary water. The leaves have a fragrant smell, and a warm pungent flavour.

ROSE-NOBLE, an ancient English gold coin, stamped with the figure of a rose; first struck in the reign of Edward III. and current at 6*s*. 8*d*. Another larger coin, sometimes so called, passed for 16*s*.

ROSET'TA STONE, a block of stone found near Rosetta, in Lower Egypt, and preserved in the British Museum. It bears three inscriptions: namely, one in hieroglyphics, another in the ancient vernacular language of Egypt, called enchorial, and the third in Greek, all recording the services rendered by Ptolemy V. to his country. This stone has acquired much celebrity from its having afforded Dr. Young a key to the interpretation of Egyptian characters. It was one of the objects collected by the French when they invaded Egypt, and came into the possession of the British army in consequence of the capitulation of Alexandria in 1801.

RO'SE-WOOD, a fragrant wood used by cabinet makers; is the produce of some Brazilian leguminous trees belonging to the genus *Trioptolomea*.

ROSICRU'CIANS (*rosa*, a rose; and *crux*, a cross: *Lat.*), from their device; which was a rose issuing out of a cross, the same as Martin Luther's device.——A name assumed by a sect of heretical philosophers, who first appeared in Germany, as is generally supposed, about the beginning of the 17th century, though they claimed a higher antiquity. They made great pretensions to science, and to be masters of many important secrets, particularly that of the philosopher's stone. Their origin and designs have been the subject of much discussion.

ROS'TRUM (*Lat.*), in Roman Antiquity, the prow of a ship. It was a most important part of vessels of war, which were hence called *Naves rostratæ;* was made of wood and brass; was fastened to the prow to annoy the enemy's vessels. The first *rostra* were long and high; but they were afterwards short and strong, and placed so low as to pierce the enemy's ships under water. Some ships of war, constructed recently by ourselves, are furnished with a similar apparatus, and for the same purpose.——The term *Rostrum* was applied metaphorically to the pleading place or pulpit, in the Roman Forum: because decorated with the beaks of vessels taken at Antium. The Rostrum was transferred by Cæsar to a corner of the Forum.

ROT (*rotan*, to rot: *Sax.*), a fatal disease incident to sheep in wet seasons and moist pastures. It is extremely difficult to prevent the rot, if the year prove very wet, especially in May and June. Salt marshes, and lands where broom grows, are the best places for the animals so affected. The livers of sheep dying of the rot are found to be infested with worms called *flukes*, which see.——ROT, in timber work [see DRY ROT].

RO'TA, the name of an ecclesiastical court at Rome, composed of twelve prelates. This is one of the highest tribunals in Rome; taking cognizance of all suits in the territory of the church, by appeal; and of all matters beneficiary, and patrimonial.

ROTA'TION (*rotatio*, from *rota*, a wheel: *Lat.*), the act of turning, like a wheel or solid body on its axis, as distinguished from the progressive motion of a body revolving round another body or a distant point. Thus the daily turning of the earth on its axis, is a *rotation;* its annual motion round the sun, is a *revolution*.——In Geometry, the term is applied to the circumvolution of any surface round a fixed and immovable line, which is called the axis of its rotation.——ROTATION, in Agriculture, a change of crops; which is useful chiefly by allowing more of the substance which a certain crop has exhausted to be liberated from the soil, before it is grown again.——ROTATION also implies the course by which persons filling official situations leave their places at certain times, and are succeeded by others.

ROTA'TOR (one who causes to revolve: *Lat.*), in Anatomy, the two apophyses in the upper part of the thigh-bone, otherwise called *trochanters*, which are distinguished into *major* and *minor*.

ROTATO'RIA (same *deriv.*), or ROTI'FERA (*rota*, a wheel; *fero*, I carry: *Lat.*), *Wheel Animalcules*, a tribe of microscopic animals forming a section of those denominated INFUSORIA. They all live in water, through which they move with great rapidity, and are usually found in great numbers wherever there is organized water in a state of decay. The majority have cilia so disposed on the anterior part of the body as to afford the appearance of revolving wheels when in motion. These animals are as yet imperfectly known. They belong to the class of ANNELIDA amongst ARTICULATA.

ROT'TEN-STONE, in Mineralogy, a soft kind of stone found in Derbyshire; which is used for all sorts of finer grinding and polishing, for cleaning metallic substances, and sometimes for cutting stones. It resembles *Tripoli*.

ROTUN'DA, or ROTUN'DO (*rotundus*, round: *Lat.*), a name given to any building that is round both on the outside and inside; but more particularly to a circular building at Rome, which was anciently called the *Pantheon*, which see.

ROUE' (*Fr.*), a term applied to a person, in the fashionable world, who, regardless of moral principle, devotes his life to sensual pleasures; but whose conduct, externally at least, is not so gross as to exclude him from society.

ROUGE (*Fr.*), a red paint extracted from the safflower, a plant called by botanists *carthamus tinctorius*. It is used for painting the cheeks; and is the only cosmetic which can be applied to this purpose without producing ultimate injury to the complexion.

ROUGH'-CASTING, a kind of plastering, with mortar containing gravel, and sometimes even very small stones; and used as a covering for external walls. It is thrown on roughly, instead of being plastered on.

ROUND'-HEADS, in British History, a name given, during the civil war, to the puritans or members of the parliamentarian party, from the practice which prevailed among them of cropping the hair close.

ROUND'ROBIN (*rond ruban*, round ribbon: *Fr.*), a term applied to a memorial or remonstrance drawn up by any body of men (though the practice is almost entirely confined to the army and navy), who have determined to stand by each other in making a statement of their common grievances to the government, or some person high in authority. The term was adopted on account of the signatures being written round the remonstrance, or in a circular form, so that it cannot be seen who signed it first.

ROYAL, among seamen, a small sail spread immediately above the top-gallant-sail; sometimes termed the *top-gallant royal*.——Royal Academy of London, a corporation instituted by George III. for the advancement of drawing, painting, engraving, sculpture, modelling, and architecture.——Royal Institution, a corporation erected in the year 1800; the great object of which is to render science applicable to the comforts and conveniences of mankind.——Royal Society, a society incorporated by Charles II. under the name of 'The President, Council, and Fellows of the Royal Society, for the Improvement of Natural Philosophy.'

ROYALS, the name given to the *first* regiment of foot: supposed to be the oldest regular corps in Europe.

ROW-PORT, a small square hole in the side of light vessels of war, near the surface of the water, for the use of an oar for rowing in a calm.

RUB'BLE, loose angular gravel; or slightly compacted brecciated sand-stone.——Rubble Work, masonry, in which the stones are used without being squared.

RU'BEFACIENT (*rube-facio*, I make red: *Lat.*), in Medicine, an external application which produces redness of the skin, not followed by a blister.

RU'BELLITE (*rubellus*, reddish: *Lat.*), in Mineralogy, *red shorl* or *red tourmalin*, a siliceous mineral of a red colour of various shades. It occurs in accumulated groups, with straight tube-like striæ. In a red heat it becomes white.

RUBE'OLA (*rubeo*, I am red: *Lat.*), the *Measles*, which see.

RU'BICEL, in Mineralogy, a variety of the ruby, of a reddish colour, from Brazil.

RU'BIDIUM (*ruber*, red: *Lat.*), one of the metals lately discovered by means of spectrum analysis. The German chemist Bunsen first detected it in some mineral water, in which it formed only a two-millionth part of the weight of the water. It has since been found in extremely minute quantities in beet-root, and in the ashes of tobacco, tea leaves, and coffee berries. Its name was suggested by its dark red colour.

RU'BIGO (*Lat.*), in Botany, a kind of mildew which appears on the leaves and stems of many plants, and has been found to consist of a small fungus, supposed to arise from moisture.

RU'BLE, a Russian silver coin, value about 3*s.* 2*d.*

RU'BRIC (*rubrica*; from *ruber*, red: *Lat.*), any writing or printing in red ink. The date and place on a title page, being frequently in red ink, and many books printed in one place having the name of another upon them, the word rubric has been sometimes used to signify the false name of a place on a title page. But the word is most usually applied in Ecclesiastical matters to signify the directions printed in red letters in missals, &c.; and hence, is often used to express the liturgy itself.

RU'BY (*rubis*: *Fr.*; from *ruber*, red: *Lat.*), a precious stone, next to the diamond in hardness and value. Its constituents are alumina, magnesia, and chromic acid—its colour being due to the latter. The most esteemed, and, at the same time, rarest colour, of the oriental ruby, is pure carmine, or blood red of considerable intensity, forming, when well polished, a blaze of the most exquisite and unrivalled tint. It is, however, usually more or less pale, and mixed with blue in various proportions; hence it occurs rose-red and reddish white, crimson, peach-blossom red, and lilac blue—the latter variety being named oriental amethyst. A ruby, perfect both in colour and transparency, is much less common than a good diamond, and when of the weight of three or four carats, is even more valuable than that gem. The king of Pegu, and the monarchs of Siam and Ava, monopolize the rarest rubies; the finest in the world is in the possession of the first of these kings; its purity has passed into a proverb.

RUDD, or RED EYE, the *Leuciscus erythrophthalmus* of ichthyologists, a river fish belonging to the *Cyprinidæ*, with a deep body like the bream, but thicker, a prominent back, and small head. The scales are of a golden-coppery tint, and the iris is orange-red.

RUD'DER (*rother*: *Sax.*), in Navigation, part of the helm of a ship; consisting of a piece of timber hung on hinges at the stern-posts, which by being turned either way directs the course of the vessel. It is managed by means of the tiller or wheel. In vessels drawing much water, the middle is deep and narrow; in others, shallow and broad; in Chinese vessels, it is broad, to give it leverage; but pierced with holes to diminish resistance from the water.

RU'DIMENTS (*rudimenta*; from *rudis*, in the natural state: *Lat.*), the first elements or principles of any art or science.

RUDOL'PHINE TA'BLES, a celebrated set of astronomical tables, constructed by Kepler, and thus entitled in honour of the emperor Rudolphus II., at whose expense they were made. They were published in 1627, and were the first ever calculated on the supposition that the planets move in elliptical orbits. They contributed greatly to the progress of Astronomy.

RUFF, the *Machetes pugnax* of ornithologists, a bird allied to the snipes, and deriving its name from the disposition of the long feathers of the neck, which stand out like the ruff formerly worn; it is, however, only the male that is furnished with this appendage, which he does not obtain till the second year. Ruffs are birds of passage, appearing at certain seasons of the year in great numbers in the north of Europe. They are generally taken in large nets. When fattened they are dressed like the woodcock, and their flesh is highly esteemed. Their pugnacious disposition is so strong, that when they are kept for the purpose of fattening, their place of confinement must be dark, for the moment any light is admitted they attack each other with fury.

RULE (*regole*, *Sax.*; from *regula*: *Lat.*), that which is established as a principle, or settled by authority for guidance and direction. Thus, a statute or law is a *rule* of conduct for the citizens of a state; precedents in law are *rules* of decision to judges. ——In Grammar, an established form of construction, in a particular class of words. ——*Rule*, in Monasteries, Corporations, or Societies, a law or regulation to be observed by the society and its particular members.

RULE OF THREE, in Arithmetic, a rule which directs, when three terms are given, now to find a fourth, which shall have the same ratio to the third term as the second has to the first. It is an application of the doctrine of *proportion* [which see], being called also the *rule of proportion*.

RUM, a well known spirituous liquor, distilled from molasses and the refuse of the cane juice, in the West Indies, whence it is imported in large quantities. Rum of a brownish transparent colour, smooth oily taste, strong body and consistence, good age, and well kept, is the best; and that from Jamaica obtains a decided preference. It is customary in some of the West India islands to put sliced pine-apples in puncheons of rum; this gives the spirit the flavour of the fruit; and hence the designation 'pine-apple rum.'

RU'MEN (*Lat.*), in Comparative Anatomy, the paunch, or first stomach of such animals as chew the cud, thence called *ruminating* animals. The only true ruminating are the cloven-footed quadrupeds, as oxen, sheep, &c.

RU'MINANTS (*rumino*, I chew the cud: *Lat.*), the name given by Cuvier to an order of hoofed mammals, feeding exclusively on vegetables, and including those having a complicated stomach of four cavities disposed so as to allow rumination, and a cloven hoof. The ox, deer, giraffe, and camel, belong to this order.

RU'MINATION (same *deriv.*), the act by which food, chewed and swallowed, is submitted a second time to mastication. Coarsely masticated food passes into the *rumen*, or paunch, or first cavity of the stomach; water, with which the second cavity, called the *reticulus*, is almost exclusively filled, is gradually mixed with the food in the rumen; after which, a portion of the mass is moulded into a ball, in the muscular canal, at the termination of the *œsophagus;* and by an inverted action of the muscles is driven into the mouth, where it is more fully masticated, and mixed with saliva, before it is again swallowed. It then passes into the *psalterium*, or third stomach, where the superfluous moisture, which might dilute the gastric juice too much, is absorbed; after which it passes gradually into the *abomasus*, or fourth stomach, in which digestion is really effected. In the camel, there are water cells at the sides of the rumen; and the psalterium is not separated from the abomasus.

RUN'CINATE (*runcina*, a large saw: *Lat.*), in Botany, a leaf is said to be runcinate when each side is coarsely divided into triangular lobes more or less directed towards the base; as in the leaf of the dandelion.

RU'NIC, a term applied to certain ancient characters, the earliest of which were found upon monumental stones. They were employed by both Scandinavians and Germans, but whence derived is not known. Some have suggested the Phœnician alphabet as their source. Their number was originally sixteen. Their great antiquity is much doubted, since they cannot be clearly traced back beyond the end of the twelfth century. They have been the subject of much debate amongst antiquarians; mystery and superstition are supposed to have been connected with them.

RUN'NER, in Sea Language, a rope belonging to the garnet, and to the two bolt-tackles. It is reeved in a single block, joined to the end of a pennant, and is used to increase the mechanical power of the tackle.

RUPEE', a coin current in British India. The gold rupee is worth about 2*s* sterling. Of the silver rupees, the new and the old are of different values.

RUP'TURE (*ruptio*, a breaking: *Lat.*). [See HERNIA.]

RUSH (*rusc: Sax.*), a name given to different plants. The common rush belongs to the genus *Juncus*, of which several species grow in watery places. The pith was formerly used for the wicks of lamps. The *bullrush*, which also grows in wet situations, belongs to the genus *Typha*. The *flowering rush* belongs to the genus *Butomus*, and is found by the sides of rivers and ditches.

RUS'SIA COM'PANY, a company for conducting the trade with Russia. It was incorporated by charter of Philip and Mary, and sanctioned by act of parliament, in 1566.

RUS'SIA LEATH'ER, the tanned hides of oxen, manufactured in a manner peculiar to the Russians; and much esteemed as a material for binding books and making many articles where a superior kind of durable leather is required. One of the best tests of genuine Russia leather is its throwing out a strong odour of burnt hide upon being rubbed.

RUST (*Sax.*), the oxide of a metal. Hence metals become rusty when exposed to air or water, by abstracting the oxygen; but grease and varnish protect them, because they prevent contact with moisture and the atmosphere.——RUST, the *Uredo rubigo* of botanists, a minute fungus in the shape of an orange powder which infests grain plants.

RUS'TIC-WORK (*rusticus*, rural: *Lat.*), in Architecture, a term used when the stones, &c. in the face of a building, or the groins, &c., are hacked or indented, so as to be rough.

RU'TA BA'GA, the Swedish turnip.

RUTH, BOOK OF, a canonical book of the Old Testament, being a kind of appendix to the book of Judges, and an introduction to those of Samuel. Its title is derived from the person whose story it principally contains.

RU'TILITE (*rutilus*, red: *Lat.*), in Mineralogy, an oxide of titanium, of a red or brownish red colour. It occurs massive, disseminated, membranous, and in crystals.

RYE (*ryge: Sax.*), the *Secale cereale* of botanists, an esculent grain that in its growth resembles wheat. It is easily cultivated, and in many parts of the continent, as well as in the north of England, is made into bread; but much coarser than that of wheat flour. All soils will produce rye, provided they are not too moist; and many barren lands which are unsuitable to the cultivation of wheat may be sown with this grain to advantage.

RY'E-GRASS, a species of strong grass, of the genus *Lolium*.

RY'OT (a subject: *Arab.*), in Hindostan, a renter of land by a lease which is considered as perpetual, and at a rate fixed by ancient surveys and valuations.

S

S, the nineteenth letter and fifteenth consonant of our alphabet, is a sibilant articulation, the sound being formed by driving the breath through a narrow passage between the palate and the tongue elevated near it, together with a motion of the lower jaw and teeth towards the upper. It is a kind of semivowel, for it can be pronounced, though imperfectly, without the aid of a vowel. The sound of this letter varies, being soft in some words, as in *this*, *thus*, &c., and like *z* in words which have a final *e*, as *muse*, *wise*, &c. It is generally doubled at the end of words. In a few words it is silent, as in *isle* and *viscount*. As an abbreviation, S was used by the ancients for Senatus; thus S.P.Q.R. *senatus populusque Romanus* (the Senate and Roman people). *Sp.* for *spurius*, &c. We use it for Sanctæ, thus S.T.P. *Sanctæ Theologiæ Professor* (Professor of Sacred Theology.) For Ship: as H.M.S. *Her Majesty's Ship*. For Sigilli: as L.S. *locus sigilli* (the place of the seal). For Style: as N.S. *new style*. For *socius*, *societas*, *south*, &c., as S.E. for *south-east*, S.S.E. for *south-south-east*, &c. In Music, for *Solo*.

SABÆ'ANS, or **SA'BIANS** (*zaba*, Lord: *Heb.*, whence *Sabaoth*), idolators of the East, who in all ages, whether converted in part to Judaism, Christianity, or Mohammedanism, or unacquainted with either, have worshipped the sun, moon, and stars. Some of the Sabæans, who acknowledge the name of Christ, are distinguished by the title of 'Christians of St. John,' on account of their attachment to the baptism of that forerunner of the Messiah. Sabæanism bears the marks of a primitive religion; to the adoration of the stars it joins a strong inculcation of respect for agriculture.

SAB'AOTH, a Hebrew word signifying *armies*.

SABBA'TARIANS, in Church History, sects which at various periods insisted on the observance of the Jewish sabbath, as obligatory on Christians. The name is particularly applied to a subdivision of the Anabaptists, in the sixteenth century.

SAB'BATH (rest: *Heb.*), the seventh day of the week, a day appointed by the Mosaic law for a total cessation from labour, and for the service of God, according to the command, 'Remember that ye keep holy the Sabbath day,' &c. Christians observe the first day of the week as the day of rest.

SABBAT'ICAL YEAR, in the Jewish economy, every *seventh* year, in which the Israelites were commanded to suffer their fields and vineyards to *rest*, or to lie without tillage. The first *sabbatical* year celebrated by the children of Israel was the fourteenth year after their coming into the land of Canaan; because they were to be seven years in making themselves masters of it, and seven more in dividing it amongst themselves.

SABEL'LA, in Natural History, a genus of marine annelides, inhabiting cases which are usually of a leathery texture. There are many species.

SABEL'LIANS, a sect of Christians founded by Sabellius, at Ptolemais, in the third century. Their doctrine was, that the Father was the sole person of the Trinity; the Son and Holy Ghost being merely attributes, or emanations from Him.

SA'BLE, the *Martes zibellina* of naturalists, an animal of the weazel family, a native of the north of Europe and Asia. It is equal to the polecat in size. In summer the colour is brown, in winter it becomes much darker, and the fur is then much prized. The Russian or crown sable obtained in Siberia is the most valuable, but this is nearly monopolized by the Imperial Family. The Hudson's Bay sable is lighter in colour and is dyed darker. The animal burrows in the earth or under trees; in winter and summer subsisting on small animals, and in autumn on berries.——SABLE, in Heraldry, the tincture of black; represented in engraving, by perpendicular and horizontal lines.

SAC'BUT, or **SACK'BUT**, a musical wind instrument; a kind of trumpet so contrived that it can be drawn out or shortened according to the tone required.

SACCA'DE (a jerk: *Fr.*), in the Menage, a sudden and violent check of a horse, by drawing or twitching the reins on a sudden, and with one pull.

SACCHAR'IC ACID (*saccharum*, sugar: *Lat.*), in Chemistry, an acid formed along with oxalic acid, when sugar is oxidized with nitric acid. It crystallizes in long colourless needles.

SACCHAR'OID (*saccharon*, sugar: *Lat.*; and *eidos*, appearance: *Gr.*), a term applied to rocks which have a texture resembling that of loaf sugar.

SACCHAROM'ETER (*saccharon*, sugar: *Lat.*; and *metior*, I measure: *Lat.*), an instrument for determining the specific gravity of brewers' and distillers' worts, the density of which is almost exactly proportional to the quantity of sugar they hold in solution—on which, also, depends the quantity of spirit that will be formed by the subsequent fermentation.

SACCHOLAC'TIC ACID (*saccharon*, sugar; and *lac*, milk: *Lat.*), in Chemistry, the acid obtained by digesting sugar of milk with nitric acid. It is identical with that obtained from gum, and termed *mucous acid*.

SACK, a wine much esteemed by our ancestors. It was brought from Spain, and is supposed to have been very similar to sherry; Falstaff calls it *Sherris Sack*. Its name is derived by some from *sec* (dry: *Fr.*), because it was a dry wine; by others, from the *sacks* made of skin, in which the Spaniards usually carried it.——Among our rude ancestors, a kind of cloak of a square form, worn over the shoulders and body, and fastened in front by a clasp or thorn. It was originally made of skin, afterwards of wool.——*To sack*, is to plunder or pillage a town when taken by assault.

SACON'TALA, a Sanscrit drama of great celebrity in Indian literature, written by Calidasa, who died in 56 B.C. It has been translated into English, French, and German. The plot turns upon a ring.

SAC'RAMENT (*sacramentum*, a sacred thing: *Lat.*), in Christian ritual, an outward sign of a spiritual grace, annexed to its use. The Roman Catholic church recognises seven sacraments; baptism, confirmation, the eucharist, penance, extreme unction, ordination, and marriage. The Sabæan Christians admitted four; the eucharist, baptism, ordination, and marriage. The Protestant churches acknowledge only two, the eucharist or Lord's supper, and baptism; but they agree with the Roman Catholic church in styling the eucharist, pre-eminently, the *holy sacrament*. The eucharist is also known among Roman Catholics by the name of 'the host.'

SACRAMENTA'LIA (same *deriv.*), in Ecclesiastical history, certain sacramental offerings formerly paid to the parish priest at Easter, &c.

SACRAMEN'TUM MILITA'RE, in antiquity, the name of the oath taken by the Roman soldiers, after the levies were completed.

SAC'RIFICE (*sacrificium*: *Lat.*), a solemn act of religious worship, consisting in the dedication or offering up something animate or inanimate on an altar, by the hands of the priest; either as an expression of gratitude to the Deity for some signal mercy, or to acknowledge our dependance on him, and conciliate his favour. The Jews had two sorts of sacrifices, taking the word in its most extensive signification: the first were offerings of tithes, first-fruits, cakes, wine, oil, honey, &c., and the last, offerings of slaughtered animals. Their principal sacrifices consisted of bullocks, sheep, and goats; but doves and turtles were accepted from those who were not able to offer the others; and whatever the sacrifice might be, it must be perfect and without blemish. The rites of sacrificing were various, all of which are very minutely described in the Pentateuch.

SAC'RILEGE (*sacrilegium*: *Lat.*), the crime of violating or profaning sacred things; or the alienating to laymen or to common purposes what has been appropriated or consecrated to religious persons or uses.

SA'CRUM, or OS SACRUM (the sacred bone: *Lat.*), in Anatomy, a portion of the vertebral column, consisting in man of five bones, which in the adults become soldered together. The sacrum is strongly united on each side to the hip bone, the *ilium*; and below it is the COCCYX. [See VERTEBRÆ.]

SAD'DUCEES, a sect among the ancient Jews, esteemed as free-thinkers, rather than real Jews; though they assisted at all the ceremonies of worship in the Temple. Their origin and name is derived from Sadoc, who flourished in the reign of Ptolemy Philadelphus, about 250 years B.C. They denied the immortality of the soul and the existence of all spiritual and immaterial beings. They acknowledged, indeed, that the world was formed by the power of God, and superintended by his providence; but that the soul at death suffered one common extinction with the body, rewards and punishments being altogether confined to this life. They held the scriptures alone to be of divine authority, and obligatory upon men as a system of religion and morals; and paid no regard to those traditionary maxims and human institutions which the Jews in general so highly extolled, and the Pharisees reverenced even more highly than the scriptures themselves.

SAFE-CON'DUCT, a pass or warrant of security given by a sovereign to any person guaranteeing his safe coming into and passing out of his kingdom. Generally speaking, passports have superseded the use of special safe conducts.

SA'FETY LAMP, a lamp invented by Sir Humphry Davy for the use of miners in the coal-mines, to prevent the fatal explosions which have arisen from the use of common lamps. It consists of a lamp surrounded by a wire-gauze, which, by confining the flame from the fire-damp, enables the miners to work in safety. Flame is merely vapour, at a white heat; when cooled down, as it is by the wire gauze, it ceases to be flame; and, at the same time, ceases to be capable of exploding the mixed gases. A flame may be hot, and at the same time not luminous: thus, that of hydrogen. Its heat will be rendered evident by throwing into it particles of lampblack, or holding within it a platinum wire; they will become white hot. The higher the temperature of the flame the more difficult to intercept it with wire gauze, because the more difficult to cool it down; hence the flame of burning hydrogen will pass through gauze, when that of a candle or coal gas will not. The inflammable gas enters the lamp through the gauze, and is gradually consumed. When the external air is safe there is no change in the flame; but on the approach of fire-damp it becomes more or less enlarged; and when the mixture is highly explosive, the interior of the lamp seems filled with a blue lambent flame, its own flame being for the time apparently extinguished, and rekindled when the air again becomes pure; but if the fire-damp greatly predominates, it is put out entirely. The miner, however, having been put on his guard, has time to escape.

SA'FETY-VALVE, a valve by means of which a boiler is preserved from bursting by the force of steam. It is loaded, according to its surface, with a certain weight, being the number of pounds to the square inch, to the pressure of which it is intended to expose the boiler; as soon as this pressure is exceeded the steam lifts the valve, and some of it escapes. That a safety-valve may be relied on, it must be frequently examined; as it is liable to adhere to its seat. This greatly increases the steam pressure required to open it; and in many cases to a degree which the boiler is unable to bear, and which, therefore, may cause an explosion.

SAF'FLOWER, or **BAS'TARD SAF'FRON**, a deep red fecula, separated from orange-coloured flowers, particularly those of the *Carthamus tinctorius*. The flowers which are sometimes sold under the name of *saffranon* are the only parts employed in dyeing. The fine rose colour of safflower, extracted by crystallized soda, precipitated by citric acid, then slowly dried, and ground with the purest talc, produces the beautiful rouge known by the name of *rouge végétale*. [See ROUGE.]

SAF'FRON (*safran: Fr.;* from *saphar: Arab.*), a sort of filamentous cake, prepared from the stigmas, with a proportion of the style, of a perennial bulbous plant, the *Crocus sativus*. It contains a yellow matter called *polychroite*, a small quantity of which is capable of covering a great body of water. It is grown in some of the eastern counties of England; and is also imported from Sicily, France, and Spain. Saffron is used to tinge confectionary articles, liqueurs, and varnishes; and sometimes in colouring butter and cheese. It was also formerly employed extensively in medicine, as well as in the arts; but is not much used at present. It is often adulterated with the petals of other plants, particularly those of the marigold.

SAGAPE'NUM (*sagapēnon: Gr.*), in Pharmacy, a gum-resin brought from the East, in granules and masses. It is of a compact substance, heavy, of a reddish colour, with small whitish or yellowish specks. Its odour is something like that of assafœtida, but weaker. It is occasionally used in medicine, as a nervine and stimulating expectorant.

SAGIT'TA (*Lat.*), in Astronomy, the *arrow* or dart, one of Ptolemy's forty-eight constellations, in the northern hemisphere, near the eagle.——In Trigonometry, the versed sine of an arc so called by the older writers, because it is like a dart or an arrow standing on the chord of the arc.

SAGITTA'RIA (*sagittarius*, pertaining to an arrow: *Lat.*), in Botany, a genus of aquatic perennial plants, nat. ord. *Alismaceæ*. One species, the arrow head, grows in Britain.

SAGITTA'RIUS (the Archer: *Lat.*), in Astronomy, the tenth of the twelve signs of the Zodiac.

SA'GITTATE (*sagitta*, an arrow: *Lat.*), in Botany, an epithet for a leaf, stipule, or anther, whose shape is triangular, and hollowed at the base, like the head of an arrow.

SA'GO, an article of food consisting of nearly pure starch; is chiefly obtained from the pith of several species of palm, especially those belonging to the genus *Sagus*, indigenous in the Indian Archipelago. After the fecula has been washed clear of the woody fibre, and has been roasted, it becomes the *pearl sago* of commerce. Further treatment converts it into *tapioca*. Sago is largely consumed by the natives of the Eastern Archipelago. 'To see sago manufactured by the natives is an extraordinary sight. A whole tree, trunk about twenty feet long and five feet in circumference, is by a few days' labour converted into human food. A good sized tree will produce thirty bundles of raw sago, weighing about thirty pounds each bundle, and when baked yielding about sixty cakes of three to a pound. Two of these cakes are a meal for a man, or about five cakes a day; and as a tree produces 1800 cakes, it gives food for one man for about a year. The labour to produce the raw sago, by breaking up and washing the pithy substance of the trunk, is about ten days for one man, which labour provides him with food for a year.'—A. R. WALLACE. In Japan and elsewhere sago is obtained from the interior of the stems of some species of *Cycas*.

SAHA'RA, or **ZAHARA** (desert: *Arab.*). The great Sahara, in the north west of Africa, is more than equal to the area of Europe. The Arabs style deserts 'seas without water,' and the camel 'the ship of the desert.'

SAH'LITE, in Mineralogy, a variety of *Augite*, from the silver mine of *Sahla*, in Sweden.

SAICK (*saica: Ital.*), a Turkish or Grecian vessel, very common in the Levant; a kind of ketch which has no top-gallant-sail, nor mizen-top-sail.

SAIL (*segl: Sax.*), in Navigation, a large piece of canvas composed of several breadths sewed together, which when extended, by means of lines, is fitted to receive the impulse of wind by which a ship is driven.——*To make sail*, is to spread an additional quantity of sail for the sake of increasing a ship's speed. *To set sail*, to expand the sails; and hence, to begin a voyage. *To strike sail*, is to lower the sails suddenly, as in saluting, or in sudden gusts of wind.

SAIL'ING, properly denotes the art of navigating and working a ship, or of causing her to observe such motions and directions as are assigned by the navigator; in which latter sense sailing differs from the art of navigation, and must be learned by practice on shipboard.——*Sailing* also denotes a particular method of navigation; in which sense we say, *Mercator's* sailing, *plane* sailing, *parallel* sailing, *middle latitude* sailing, and *great circle* sailing. [See NAVIGATION.]

SAINT (*Fr:* from *sanctus*, holy: *Lat.*), in a limited but the most usual sense of the word, signifies certain individuals whose lives were deemed so eminently pious that the church of Rome has authorized the rendering of public worship to them. The doctrine of saints, and the ideas and usages which grew out of it, form one of the main points of difference between the Protestants and Roman Catholics.

SAL'AMANDER (*salamandra: Gr.*), in Zoology, a genus of Batrachian reptiles, now limited to the terrestrial species of the longtailed Caducibranchiate Batrachians; or those which lose their gills before arriving at maturity, but retain their tails. The female brings forth her young alive; they are hatched in the oviduct. The salamander is a harmless animal, which dwells in cold damp places, among trees or hedges, avoiding the heat of the sun; yet ignorance and superstition have ascribed to it the power of resisting fire.

SAL AMMO'NIAC, in Chemistry, *Muriate of Ammonia*, or, perhaps more correctly, *Chloride of Ammonia*, a salt found originally near the temple of Jupiter Ammon in Lybia, and hence its name. It is made abundantly in Egypt from the soot of camel's dung, which is burnt in Cairo instead of wood; and in every part of Egypt, but especially in the Delta, peasants are seen driving asses loaded with bags of that soot, on their way to the sal ammoniac works. Various animal offals develop, during their spontaneous putrefactive fermentation, or their decomposition by heat, a large quantity of free or carbonated ammonia among their volatile products; and upon this principle many sal ammoniac works have been established. It is made in large quantities from *gas liquor*, which contains the carbonate and other compounds of ammonia. These are changed into muriates or chlorides by hydrochloric acid; are then separated by concentration and crystallization, and resulting sal ammoniac is purified by sublimation. The best sal ammoniac is in white semi-transparent spheroidal cakes, each weighing about a quarter of a cwt. It is principally used in tinning of cast iron, wrought iron, copper, and brass; and for making the various ammoniacal preparations of pharmacy.

SAL'ARY (*salaire: Fr.*, from *salarium*, literally, the money given to soldiers for salt: *Lat.*), the stipend or remuneration paid to a man for his services—usually a fixed annual sum; in distinction from *wages*, which is for day labour; and *pay*, which is for military service.

SAL'EP, or SALOP', in the materia medica, the dried root of the *orchis mascula*. It consists chiefly of a modification of gum, resembling *tragacanth*, with a small quantity of starch, and is sometimes used as food. That which is imported from India is in white oval pieces, hard, clear, pellucid, and without smell; as an article of diet, it is said to be light and nutritious.

SAL'IC, or SAL'IQUE LAW, the Law of the Ripuarian Franks, governing those who lived between the Rhine and the Loire. Some believe the name derived from the river Saale, in Saxony, on the banks of which it is supposed that these people originally lived. This body of law was reformed and republished by Charlemagne; according to it 'no portion of *Salic land* can fall to females;' but what was meant by *Salic* land has been the subject of endless discussion among French antiquaries. The Salic law, which excluded females from the throne of France, was supposed to be derived from this ancient code. It was the subject of long wars between England and France, when, in opposition to it, Edward III. claimed the sovereignty of France by a title prior to that of Philip of Valois. It has been recognised in all countries of which the crown has devolved on the royal family of France; and formed the foundation of the pretensions of Don Carlos to the crown of Spain. It was observed with reference to the great fiefs which had been granted to princes of the blood royal, by way of appanage; and hence, on the death of Charles Duke of Burgundy, without a male heir, that dukedom reverted to Louis XI. Hanover, which was so long united to the crown of England, ceased to be so on the accession of Queen Victoria; as its succession is regulated by the Salic law.

SAL'ICINE (*salix*, the willow: *Lat.*), an alkaloid obtained from the bark of the white willow (*Salix alba*), and some others, from that of the aspen-tree and some poplars. It is employed as a febrifuge, and its crystals form a beautiful polarising object for the microscope.

SA'LIENT (*saliens*, leaping: *Lat.*), in Heraldry, an epithet applied to a lion or other beast, represented in a leaping posture, with his right foot in the dexter point, and his hinder left foot in the sinister base of the escutcheon: by which it is distinguished from *rampant*.——COUNTER-SALIENT is when two beasts on the same escutcheon are salient, the one leaping one way, and the other in an opposite direction, so that their bodies cross.

SA'LIENT ANGLE, in Geometry, and Fortification, the angle of a polygon, which projects outwards from the figure. All the angles of any regular figure are salient. An angle which points to the interior of the figure, is *reentering*.

SALIFI'ABLE BASES (*sal*, salt; and *facio*, I make: *Lat.*), in Chemistry, substances which, when combined with acids, form salts.

SALINOM'ETER, an apparatus connected with the boilers of steam engines, for the purpose of ascertaining the density of the water therein when salt water is employed. When of more than a certain density, the water is 'blown off,' as its further use would be attended with danger.

SALI'VA (*Lat.*), the fluid secreted by certain glands, by which the food is moistened before it is conveyed into the stomach. Those glands which secrete the saliva are termed salivary, and are situate in the mouth.

SALIVA'TION (*salivatio: Lat.*), in Medicine, an increased secretion of saliva, the result of the exhibition of certain medicines.

SA'LIX (*Lat.*), in Botany, a genus of plants, nat. ord. *Salicaceæ*. All the species of *Salix* are either trees or bushes, and are known as willows, very hardy, remarkably fast growers, and several of them attain a considerable height when permitted to run up to standards. Some equal large forest trees, thus the *Salix alba;* while others, like the *Salix herbacea,* are so small as to be lost in the grass in which they grow. They are generally the most abundant, and of most prosperous growth, in watery situations.

SAL'LY (*saillie: Fr.*), in the Military art, the issuing out of the besieged from a town or fort, and falling upon the besiegers in their works, in order to cut them off, or harass and exhaust them.——'To cut off a *sally,*' is to get between those that made the sally and their town.

SAL'LY-PORT, in Fortification, a postern gate, or a passage under ground from the inner to the outer works; such as from the higher flank to the lower, or to the communication from the middle of the curtain to the ravelin. Sallyports are called also, *postern gates.*——SALLY-PORT, a doorway on each quarter of a fire-ship, out of which the men make their escape into the boats, as soon as the train is fired.

SAL'MON (*salmo: Lat.*), the *Salmo salar* of ichthyologists, a fish without spines in the fins, with abdominal ventral fins, and with a rudimentary fin behind the first dorsal. It is found in the seas washing the shores of Europe, Asia, and America; ascending the rivers for spawning in spring, and penetrating to their head streams. It is remarkably strong, and will even leap over considerable falls which lie in the way of its progress. It generally varies from about 12 to 24 pounds in weight; but sometimes salmon are taken weighing from 50 to upwards of 80lbs. It furnishes a delicious dish for the table, and is an article of commerce. The process of spawning frequently occupies more than a week: during which the eggs deposited by a single fish sometimes amount to 20,000. The spawning season extends from the end of October to the beginning of February. The eggs of the salmon remain in the gravel for several months, exposed to the influence of running water. In the course of the month of March the fry are evolved. When newly hatched they are scarcely an inch in length, of the most delicate structure, and for a while connected with the egg. Upon leaving the spawning bed, the fry betake themselves to the neighbouring pools, where they speedily increase to two or three inches in length. In April, May, and June they migrate towards the sea, keeping near the margin, or still water, in the river; and when they reach the estuary, they betake themselves to a deeper and more sheltered course, and escape to the unknown haunts of their race, to return shortly after as *grilses,* along with the more aged individuals. All these seaward migrations of the parent fish and the fry are influenced, and greatly accelerated, by the occurrence of the floods in the rivers.——The London market, where the consumption is immense, is principally supplied from the Scotch rivers. The Tweed fishery is the first in point of magnitude of any in the kingdom; and such is its abundance, that several hundreds have been frequently taken by a single sweep of the net. When the season is at its height, and the catch greater than can be disposed of fresh, it is salted, dried, or pickled, for winter consumption at home. [See FISHERIES.]

SALOON' (*salone: Ital.*), in Architecture, a lofty spacious hall, vaulted at the top, and generally comprehending two stories, with two ranges of windows. In Italy, it is used as a state room in palaces, for the reception of ambassadors and other visitors.

SAL'PA (*Lat.*), a genus of small animals which swim freely in the ocean, and belong to the *Tunicata.*

SALSES, small mud volcanoes, which may be considered as phenomena intermediate between thermal springs and eruptions of larva. On their first outbreak they are generally accompanied by flames.

SAL'SOLA (*salsus,* salt: *Lat.*), in Botany, a genus of plants, nat. ord. *Chenopodiaceæ,* often called saltworts, from the large yield of soda.

SALT (*sealt: Sax.*), in the popular sense, is a saline crystallization, used to season or preserve meats. This is usually called common salt, which is procured by evaporating sea-water, or the water of salt springs; or is dug in mines. White salt and bay salt are of the former kind; and fossil or rock salt of the latter. In sea salt prepared by rapid evaporation, the insoluble portion is a mixture of carbonate of lime with carbonate of magnesia, and a fine silicious sand; and, in the salt prepared from Cheshire brine, it is almost entirely carbonate of lime. The insoluble part of the less pure pieces of rock salt is chiefly of a marly earth, with some sulphate of lime. In Caramania, in Asia, Chardin tells us, rock salt is so abundant, and the atmosphere so dry, that the inhabitants use it as stone for building their houses. This mineral is also found on the whole elevated table land of Great Tartary, Thibet, and Hindostan. Extensive plains in Persia are covered with a saline efflorescence. Rock salt has also been found in New South Wales. The principal deposit of this substance in Great Britain is in Cheshire. The beds alternate with clay and marl, which contain gypsum. It occurs also at Droitwich in Worcestershire. The salt mines in the neighbourhood of Northwich are very extensive. They have been wrought since 1670; and the quantity of salt obtained from them is greater, probably, than is obtained from any other salt mines in the world. The Cheshire salt, in its solid form when dug from the mine, is not sufficiently pure for use. It is purified by solution in sea water, from which it is afterwards separated by evaporation and crystallization. The beds or masses of rock salt are occasionally so thick, that they have not been yet bored through, though mined for many centuries; but it is sometimes disseminated in small masses or veins among the calcareous and argillaceous marls which accompany or overlie the greater deposit. In the places where there are salt springs, and salt works are carried on at them, the work-house where the salt is made is always called the *wych-house;* it is supposed that *wych* was an old British word for salt, as all the towns in which salt is made end in *wych*: as *Namptwych*, *Droitwych*, *Middlewych*, &c.—There are places in America where the sea occasionally overflows; and the water evaporating leaves the salt behind. These are called *licks*, and are the resort of vast crowds of different quadrupeds. Salt is next in importance to bread. And the most serious disturbances have occasionally occurred in countries where a comparatively heavy tax has been laid upon it. The annual consumption in Great Britain alone, without including Ireland, is 180,000 tons. 300,000 tons are exported.——*Salt*, in Chemistry, has a more extended sense; and includes all compounds of an acid and a base, such as *sulphate of potash*; or of the radical of the acid and the base of the oxide, as *iodide of potassium*. A salt consisting of an oxacid and an oxide is termed an *oxysalt*; one consisting of the radical of the acid and the base of the oxide a *haloid* salt. There are *acid*, *alkaline*, and *neutral* salts. In the first the acid, in the second the alkali, and in the third neither predominates. Salts assume various other designations, depending on the acid, the base, or both. [See CHEMISTRY.] Sometimes a salt is *hydrous*; that is, contains water in combination; sometimes *anhydrous*, containing no water.

SALT'IRE (*saltiere*: *Fr.*), in Heraldry, one of the eight greater ordinaries; a *St. Andrew's cross*. Charges such as swords, batons, &c. placed in the direction of Saltire, are said to be borne *saltire-wise*.

SALTPE'TRE. [See NITRE.]

SALU'TE (*saluto*, I greet: *Lat.*), in Military discipline, a testimony or act of respect performed in different ways, according to circumstances. In the army, the officers salute by dropping the point of the sword; also by lowering the colours and beating the drums. In the navy, salutes are made by discharges of cannon, striking the colours or top-sails, or by volleys of small arms. Ships always salute with an odd number of guns. The vessel under the wind of the other fires first.

SAL'VAGE (*salvo*, I save: *Lat.*), in Commerce, a recompense allowed to such persons as have assisted in saving goods from fire, loss at sea, or ships from shipwrecks, &c.

SALVATEL'LA, in Anatomy, the vein which runs along the arm, and terminates in the little finger; so named from *salus*, health, because the opening of it was formerly thought to be of singular use in hypochondriacal affections.

SAMAR'ITAN, an inhabitant of Samaria, or one that belonged to the sect which derived their appellation from that city. After the fall of the kingdom of Israel, the people remaining in its territory, and consisting of the tribes of Ephraim and Manasseh, mingled with some Assyrian colonists, were called Samaritans by the Greeks, from the city of Samaria, around which they dwelt. When the Jews, on their return from captivity, rebuilt the temple of Jerusalem, the Samaritans desired to aid in the work; but their offers were rejected by the Jews, who looked upon them as unclean, on account of their mixture with heathens; and the Samaritans revenged themselves by hindering the building of the city and temple. Hence the hatred which prevailed between the Jews and Samaritans, which, in the time of Jesus, when the latter were confined to a narrow strip of country between Judea and Galilee, prevented all intercourse between them, and still continues. In their religious opinions and usages they resemble those Jews who reject the Talmud, and differ from the rabbinical Jews, in receiving only the Pentateuch, and in rejecting all the other portions of the Bible, as well as the Talmud and rabbinical traditions; but in their manners, rites, and religious ceremonies, they adhere strictly to the Mosaic law.

SA'MIAN EARTH and STONE (from the isle of *Samos*), the name of a species of marl, formerly used in medicine as an astringent; and by goldsmiths, for brightening and polishing gold.

SA'MIEL (*Turk.*), the name for a hot, suffocating wind of the desert of Arabia. It blows in the months of July and August, and approaches the very gates of Bagdad, but is said never to affect a person within its walls. It frequently passes with the velocity of lightning, and there is no way of avoiding its dire effects, but by falling on the ground, and keeping the face close to the earth. Those who are negligent of this precaution experience instant suffocation. It is identical with the *Simoon* of the Arabians; it derives its qualities from blowing over parched and sandy deserts.

SAM'PHIRE (*Saint Pierre*: *Fr.*), an umbelliferous plant, the *Crithmum maritimum* of botanists. It grows on rocks near the seashore, where it is washed by the salt water. It is used for pickling.

SAM'SHOO, the name of a spirit obtained from rice, and largely consumed by the Chinese.

SAM'UEL, THE BOOKS OF, two canonical books of the Old Testament, so called, as being usually ascribed to the prophet Samuel. The books of Samuel and the books of Kings are a continued history of the reigns of the kings of Israel and Judea.—The first book of Samuel comprehends the transactions under the government of Eli and Samuel, and under Saul the first king; and also the acts of David while he lived under Saul. The second book is wholly occupied in relating the transactions of David's reign.

SAN-BEN'ITO, a kind of linen garment, painted with hideous figures, and worn by persons condemned by the Inquisition. Also a coat of sackcloth used by penitents on their reconciliation to the church.

SANC'TUARY (*sanctuarium*: *Lat.*), in a general sense, any sacred asylum; but more especially, THE SANCTUM-SANCTORUM, the most retired part of the temple at Jerusalem, called also the *Holy of Holies*; in which was kept the ark of the covenant, and into which no person was permitted to enter except the high-priest, and he only once a year, to intercede for the people.——SANCTUARY, in the Roman Catholic church, that part of the church immediately round the altar. Also, certain churches and shrines, to which criminals might fly for shelter. They were originally intended to preserve them from sudden and revengeful punishment. In England, anyone who fled to a sanctuary, and within forty days gave signs of repentance, was secure from punishment, if he subjected himself to banishment. [See REFUGE, CITIES OF.]

SAND, fine particles of stone, particularly of the silicious kind, ,but not reduced to powder or dust. Sand is of great use in the glass manufacture, the white writing sand being employed for making the white glass, and a coarse greenish looking sand for the green glass.——*Sands*, in the plural, tracts of land, consisting of sand, like the deserts of Arabia and Africa.

SAN'DAL (*sandalon: Gr.*), in Antiquity, a kind of costly slipper, worn by the Greek and Roman ladies; made of silk or other precious stuffs, and ornamented with gold or silver.

SAN'DAL-WOOD, or **SAN'DERS-WOOD**, the wood of the *Pterocarpus santalinus*, a large tree, growing on the coast of Coromandel, and other parts of India, especially of Ceylon. It is of a red colour, has little taste or smell, and is principally used as a colouring drug. Other kinds of sandalwood were used by the Oriental nations, for burning in their houses, and thus producing a fragrant odour; also for the manufacture of a powder, of which they form a paste, used in anointing their bodies.

SAN'DARACH, or **GUM SAN'DARACH**, a resinous substance exuding from the *Callitris quadrivalvis*, a coniferous tree that grows in Barbary. It is used in powder under the name of *pounce*, to prevent ink from spreading on paper.

SAND'BAGS, bags fitted for holding sand or earth, and used in preparing breaches in fortifications, &c.

SAND'-BOX, a West Indian tree, the *Hura crepitans*, nat. ord. *Euphorbiaceæ*. It is said that the pericarp of the fruit will burst in the heat of the day with a loud report, and throw the seeds to a distance.

SAN'DEVER, or **SAN'DIVER** (*sandever: Fr.*), a whitish salt which is cast up from the materials of glass in fusion, and, floating on the top, is skimmed off. A similar substance is thrown out in eruptions of volcanoes. It is used in the fusion of certain ores, and is also employed in medicine.

SAND'PIPER, in Ornithology, wading birds of the genus *Tringa*, subgenus *Totanus*, and of various species, many of which are widely diffused.

SAND'STONE, in Mineralogy, masses of stone, composed of agglutinated grains of sand, which may be either *calcareous* or *silicious*. Sandstones usually consist of the materials of older rocks, as granite, broken up and comminuted, and afterwards deposited again.

SANG FROID (*Fr.*), freedom from agitation or excitement of mind.

SAN'GIAC, or **SAN'JAK**, a governor of a district in Turkey, forming part of a Pashalic. Before the loss of Greece and the Caucasus, there were 290 sangiacates in the Turkish empire.

SAN'GUINE (*sanguineus*, blood-coloured: *Lat.*), in Heraldry, an epithet for a dark red colour; represented in engraving by lines hatched across one another diagonally.

SAN'HEDRIM (*Heb.*), a word said to be derived from the Greek, and signifying the great public council, civil and religious, of the ancient Jewish republic or hierarchy. This council consisted of seventy-one or seventy-two members, and was composed of chief priests, elders, and scribes. They received appeals from other tribunals, and had power of life and death.

SA'NIES (*Lat.*), in Medicine, a thin, unhealthy purulent discharge from wounds or sores.

SAN'SCRIT, the ancient language of India, now extinct, from which most of the languages there spoken are derived. It belongs to the Aryan or Indo European group of tongues. It was declared by Sir William Jones to be more perfect than the Greek, more copious than the Latin, and more refined than either. The literature is abundant. The earliest existing work is the VEDAS. These, and the PURANAS, are religious writings, but there are also Epic poems, dramas, and philosophical compositions. The Sanscrit has been much investigated of late years, not only on account of its literature, but with reference to the history and connection of the whole group of languages to which it belongs. The literal meaning of the word Sanscrit is said to be 'polished'; in India the language is called *Sura Cani*, or the language of the heavenly regions. It is now publicly taught at several of the German universities, as well as at Oxford, Cambridge, and London.

SANS-CULOTTES (*sans*, without; *culottes*, breeches: *Fr.*), the name given in derision to the popular party, by the aristocratical, in the beginning of the French revolution of 1789; but though in the first instance applied by way of contempt, yet when the fiercest principles of republicanism prevailed, *sans-culottism* became a term of honour; and some of the bravest generals, in their dispatches announcing their victories, gloried in the name.

SAP (*sæpe: A. Sax.*), the juice of plants, which is absorbed from the earth by the roots; rises through the tissue of the stem, dissolving the secretions it meets with in its course, and thus acquiring new properties; it is conveyed thence to the leaves, where it is assimilated and altered; and from the leaves to the bark. In its crude state it consists of little more than water, holding earthy and gaseous matter, particularly carbonic acid, in solution. It passes, in its upward motion, through all the tissue of the stem which is permeable; and probably through all the tubes and vessels of the wood, and their intercellular passages. The sap is to the tree what the blood is to the animal; it supplies all that is required for sustenance or growth.——*Sap*, in Fortification, a trench or approach made under cover of gabions, &c.

SAPONA'RIA (*sapo*, soap: *Lat.*), in Botany, a genus of plants, nat. ord. *Silenaceæ*, including the *S. officinalis*, or soapwort, a

British plant, of which a decoction is used to cleanse and scour woollen cloths; the poorer people in some countries use it instead of soap for washing.

SAPPAN-WOOD, the produce of a leguminous tree growing in India, the *Cæsalpinia Sappan* of botanists; it is employed in dyeing.

SAPPHIC, pertaining to Sappho, a Grecian poetess; as *Sapphic* odes, &c. The *Sapphic verse* consists of eleven syllables in five feet, of which the first, fourth, and fifth, are trochees, the second a spondee, and the third a dactyl, in the first three lines of each stanza, and a dactyl and spondee in the fourth line.

SAP'PHIRE (*sappheiros*: *Gr.*), a very hard gem, consisting of alumina. It is of various colours, the *blue* being generally called the sapphire; the *red* the oriental ruby; and the *yellow* the oriental *Topaz*. Sapphires are found in various places; as Pegu, Calicut, Cananor, and Ceylon, in Asia; and Bohemia and Silesia, in Europe. The *asterias*, or star-stone, is a very beautiful variety, in which the colour is generally of a reddish violet, with an opalescent lustre.

SAP ROLLER, in Siege operations this consists of two concentric gabions placed one inside the other, each six feet long, the space between them being filled with logs of hard wood. When a sapper is engaged at the head of an approach or trench in pushing the work towards the enemy, a sap roller is employed to protect him.

SAR'ABAND (*Span.*), a dance and a tune used in Spain, said to be derived from the Saracens.

SAR'COCOL, or SAR'COCOLLA (*sarx*, flesh; and *kolla*, glue: *Gr.*), a gum resin brought from the northern parts of Africa, in small grains of a light yellow or red colour. It is obtained from the *penda sarcocolla*; it resembles gum-arabic, but is soluble in alcohol; and its aqueous solution is precipitated by tannin.

SAR'COLITE (*sarx*, flesh; and *lithos*, a stone: *Gr.*), a species of Zeolite, of a flesh colour.

SARCOL'OGY (*sarx*, flesh; and *logos*, a discourse; *Gr.*), that part of Anatomy which treats of the soft parts of the body; as the muscles, fat, intestines, vessels, &c.

SARCO'MA (*Gr.*; from *sarx*, flesh), any fleshy excrescence on an animal body.

SARCOPH'AGUS (*sarkophagos*, from *sarx*, flesh; and *phagein*, to eat: *Gr.*), a species of limestone of which ancient coffins were made; and which, according to Pliny, had the power of destroying within forty days the corpses put into them. This quality brought the stone into very common use; and thus the name came to be applied to all coffins of stone, though often used for a contrary purpose to that which the name expresses. Of the great number of *sarcophagi*, which have come down to us, several are known by particular names; as, the sarcophagus of Homer, in the Besborodko gardens at St. Petersburg; and that of Alexander the Great, in the British Museum, once in the Mosque of St. Athanasius at Alexandria. It was taken by the British from the French, during their memorable campaign in Egypt.

SARDON'IC LAUGH (*risus sardonicus*), so called from the herb *sardonia*, which grows in Sardinia, and, being eaten, is said to cause a deadly convulsive laughter, or spasmodic grin.

SAR'DONYX (*sardonux*, the Sardinian onyx: *Gr.*), a genus of semi-pellucid gems, of the onyx structure, zoned or tabulated; and composed of the matter of the onyx, variegated with that of the red or yellow carnelian. It is often blood red, by *transmitted* light.

SARGASSO SEA. In the middle of the Atlantic ocean, and to the west of the Canaries and the Cape Verde Islands there is a large tract of quiet water many hundred square miles in extent, covered with floating seaweed, of which that called Sargasso is the principal Another species, the *Macrocystis pyrifera* of botanists, has stems more than a thousand feet long, but only of the thickness of a finger, while it branches into thread-like divisions. This vast oceanic meadow is the abode of myriads of small crustaceans, and minute organisms. Vessels avoid this calm tract, but Columbus was entangled in it on his first voyage, and imagined when he first met with it that he was in the neighbourhood of land.

SARMEN'TOUS (*sarmentosus*, full of twigs: *Lat.*), in Botany, an epithet for a stem that is filiform and almost naked; or has leaves only in branches at the joints or knots, where it strikes root.

SARSAPARIL'LA, the roots of plants growing in South America and the West Indies; species of *Smilax*, valued in Medicine for their mucilaginous and demulcent qualities.

SARTORIUS MUSCLE (*sartor*, a patcher: *Lat.*), a muscle of the thigh, which bends the leg obliquely inwards, when the thighs are crossed, as those of tailors usually are.

SAS'SAFRAS, a tree of the genus *Laurus*, whose bark has an aromatic smell and taste, and is used in medicine.

SAS'SOLINE, in Chemistry, native *Boracic acid*, found in saline incrustations on the borders of hot springs near Sasso, in the territory of Florence.

SAS'TRA, among the Hindoos, a book containing sacred ordinances. The six great *Sastras*, in the opinion of the Hindoos, contain all knowledge, human and divine. These are called the Veda, Upaveda, Vedanga, Purana, Dherma, and Dersana.

SAT'ELLITE (*satelles*, an attendant: *Lat.*), in Astronomy, a small planet revolving round another. [See ASTRONOMY, PLANET, &c.] A secondary, which revolves round a primary planet. The earth has one satellite, the moon; Jupiter has four; Saturn, eight; Uranus, four; and Neptune, probably two.

SAT'IN (*Fr.*), a soft closely woven silk, with a glossy surface. In the manufacture of other silken stuffs, each half of the warp is raised alternately; but in weaving satin, the workman only raises the fifth or the eighth part of the warp; in which way it acquires that lustre and brilliancy which distinguish it from most other kinds of silks. The chief seats of the satin manufacture are Lyons in France, and Genoa and Florence in Italy.

SAT'IRE (*Fr.; from satira: Lat.*), in Literature, a species of writing, the object of which is always castigation. It presupposes not merely much natural wit, but also acute observation, and familiarity with varied life and manners to call this wit into exercise.

SATURA'TION (*saturatio*, a satisfying: *Lat.*), in Chemistry, that point at which a body ceases to have the power of dissolving or combining with another; thus when nitric acid has dissolved lime to its fullest extent, it is said to be saturated with lime.

SAT'URDAY, the last day of the week. It was dedicated by the Romans to Saturn, and hence called *dies saturni* (Saturn's day). The Scandinavians, and from them the Saxons, had a deity named *Seater*, from whom some believe the English name is derived.

SATURE'IA (*Lat.*), in Botany, a genus of plants, nat. ord. *Labiatæ*. The species are garden herbs, well known by the name of *savory*.

SA'TURN, in Astronomy, a conspicuous planet, though not so brilliant as Jupiter, Venus, or even Mars. Its diameter is about 76068 miles; and his volume nearly 1000 times that of the earth. He revolves at the distance of about 890 millions of miles from the sun, and the period of his sidereal revolution is about 29½ years. His orbit is nearly circular; and, at the beginning of the present century, it was inclined to the ecliptic at an angle of 2° 29′ 35″, that eccentricity being subject to a decrease of 0·155″ annually. He rotates about his axis, in 10h. 29m. 16·8s; this rapid motion produces great centrifugal force; and hence he is very much flattened at the poles. Unlike any other planet of the solar system, Saturn has three rings—one having been discovered lately; they lie in the same plane, and are concentric with the planet and each other. The exterior ring is 21146 miles in width; the next 34351 miles; they are 1791 miles from each other; and the inner one 19090 miles from the planet; they are not more than 250 miles in thickness. The third ring is very faint and dusky; but there is no doubt of its existence. These rings consist of solid matter, as appears from the shadow they cast; and they revolve round their centres.

SATURNA'LIA (*Lat.*), in Antiquity, feasts in honour of Saturn. The Saturnalia are by some supposed to have had their origin in Greece; but by whom they were instituted or introduced among the Romans is not known, as their origin is lost in the most remote antiquity. They were celebrated with such circumstances as were thought characteristic of the golden age; particularly the overthrow of distinction and rank. Slaves were reputed masters during the three days they lasted; were at liberty to say what they pleased; and, in fine, were served at table by their owners. These festivities, in which men indulged in riot without restraint, were held annually towards the end of December.

SA'TYR (*saturos: Gr.*), in Heathen Mythology, a sylvan deity

ed as a monster,

having horns on hi

the feet and tail of a goat. Satyrs are usually found in the train of Bacchus, and have been distinguished for lasciviousness and riot.

SAU'CISSE (a sausage: *Fr.*), in the art of war a long pipe or bag, made of cloth well pitched, or of leather; filled with powder, and extending from the chamber of the mine to the entrance of the gallery. It serves to communicate fire to mines, caissons, bomb-chests, &c.

SAUCISSON'S (same *deriv.*), in Fortification, faggots, or fascines, made of great boughs of trees bound together; their use being to cover men, or to make epaulements, &c.

SAU'RIAN (*sauros*, a lizard: *Gr.*), an epithet applied to reptiles of the lizard tribe.

SAUS'SURITE, in Mineralogy, a variety of *Nephrite*: so called in honour of Saussure, who discovered it on the banks of the lake of Geneva.

SAVAN'NA, or SAVAN'NAH, an extensive open plain, destitute of trees; found on the banks of the Missouri and Mississippi.

SAX'IFRAGE (*saxifragus*; from *saxum*, a stone; and *frango*, I break: *Lat.*—on account of its supposed effect on stone in the bladder), in Botany, a genus of plants of many species. Also, a medicine that has the reputation of being a solvent for the stone.

SCA'BIES (*Lat.*), in Medicine, a disease of the skin, accompanied by itching, caused by insects breeding in the parts affected.

SCABIO'SA (*last*: because supposed to cure it), in Botany, a genus of plants, nat. ord. *Dipsaceæ*. The species are nearly all perennials, as the Alpine scabious, &c.

SCAGLIO'LA (*Ital.*), in Architecture, a composition which is an excellent imitation of marble. It is composed of gypsum, or sulphate of lime, calcined and reduced to a fine powder, and made into a paste with water, when the colour to be coated has been prepared with a surface of lime and hair; the calcined gypsum, previously passed through a sieve, is mixed with glue and isinglass, and laid on with wooden moulds, the proper colours being put in during the operation. When set it is smoothed with a pumice stone, and at the same time washed with a sponge and water; it is then polished with tripoli, &c., and finished with pure oil.

SCALE (*scala*, a flight of steps: *Ital.*), in Music, a series of sounds, rising in acuteness, or falling in gravity, through degrees into which all the harmonic intervals are conveniently divided.——*Scale*, in Arithmetic, the order of progression on which any system of notation is founded; as the *binary decimal*, &c.——*Scale*, in Mensuration, a line or rule of a definite length, divided into a given number of equal parts; for the purpose of measuring other linear magnitudes. The scales of thermometers are graduated from some arbitrary point in degrees, which are also arbitrary.——*Scale*, in Zoology, small thin plates, which grow out of and defend the skin of fishes. They appertain to the system of the *rete mucosum* beneath the true epidermis. The so called scales of serpents and other reptiles are modifications of the epidermis itself.

SCA'LE-STONE, or SCHAAL'STEIN, a rare mineral, of a grayish or pearly white colour, tinged with green, yellow, or red. It is also called *Tafel-spath*, and *tabular spar*; and is composed of thin laminæ collected into large prismatic concretions.

SCAL'LOP (*escallop*: *Fr.*), a species of Pecten. The scallop shell was worn by Roman Catholic pilgrims.

SCAL'PEL (*scalpellum*: *Lat.*), in Surgery, a knife used in anatomical dissections and surgical operations.

SCAM'MONY (*scammonia*: *Gr.*), gum-resin, obtained from a plant of that name. It is of a blackish gray colour, a strong nauseous smell, and a bitter and very acrid taste. It is a strong and efficacious purgative. The best scammony comes from Aleppo, in light spongy masses, easily friable.

SCANDALUM MAGNATUM (a slander against persons of rank: *Lat.*), in Law, a defamatory speech or writing made or published to the injury of a person of dignity, It is not necessary that it should be such as would be actionable at common law, in the case of a person of inferior station. This action has not been brought for a long period; the last instance of it seems to have been in the eighth year of Queen Anne.

SCAN'NING (*scando*, I measure verses, literally, I climb: *Lat.*), in Latin poetry, the examining a verse by counting and examining the feet, to see if the quantities are duly observed; or, according to modern usage, to recite or measure verse by distinguishing the feet in pronunciation.

SCAN'SORES (*Lat.*, from *scando*, I climb), climbing birds. An order which includes those possessing the power to turn one toe back, so as to have two toes before. This order has been divided into four families: 1. *Ramphastidæ*, the toucans. 2. *Psittacidæ*, parrots. 3. *Picidæ*, woodpeckers. 4. *Cuculidæ*, cuckoos.

SCAPE (*skapos*, a stalk: *Lat.*), in Botany, a stem bearing the fructification without leaves, as in the narcissus and hyacinth.

SCA'PE-GOAT, in the Jewish ritual, a goat which was brought to the door of the tabernacle, where the high-priest laid his hands upon him, confessing the sins of the people, and putting them on the head of the goat; after which the goat was turned loose into the wilderness.—Levit. xvi.

SCA'PEMENT, in Horology, the manner of communicating the impulse of the wheels to the pendulum. Common scapements consist of the swing wheels and pallets only; but modern improvements have added other levers or detents.

SCAP'OLITE (*scapos*, a stalk; and *lithos*, a stone: *Gr.*), a mineral, the crystals of which are often collected in groups of parallel, diverging, or intermingled prisms, whence its name.

SCAP'ULA (*Lat.*), in Anatomy, the shoulder-blade: a bone which is fixed to the upper, posterior, and lateral part of the thorax, extending from the first to about the seventh rib. The uses of the scapula are to sustain the arms, and join them to the body; to serve for the insertion of several muscles; and to add somewhat to the defence of the parts contained within the thorax. It is of various shapes in different animals; and, in most fishes, is articulated to the back of the skull.

SCAP'ULAR (from *last*), in Ornithology, the name given to a feather which springs from the shoulder of the wing, and lies along the side of the back.

SCAP'ULARY (same *deriv.*), a part of the habit of certain religious orders in the Roman Catholic church; consisting of two narrow slips of cloth worn over the gown, covering the back and breast, and extending to the feet. Simon Stock, an Englishman, in the 13th century, under the authority of a vision, introduced the notion that the scapulary is a distinctive mark of devotion to the Virgin Mary; since which time a conviction has been very commonly entertained among devotees, that those wearing it at the hour of death are specially fortified against the consequences of their transgressions. The scapular worn by the laity on ordinary occasions consists of two small square pieces of stuff, united by pieces of tape, and having the symbol which indicates the Virgin's name, &c., embroidered upon them.

SCARABÆ'US (*Lat.*, from *skarabos*, *Gr.*), the name formerly given by entomologists to a genus of beetle now so numerous that they are divided into several genera.——SCARABÆUS, in Antiquities, a symbol anciently worn by the Egyptians and Etruscans, as an amulet. Amongst Egyptian carvings there are many representations of these sacred Scarabæus, the emblem of their deity, Phtha, or Vulcan, the god of eternal fire.

SCARF'-SKIN, in Anatomy, the first and outermost of the three layers of which the skin is composed. The *Cuticle* or *Epidermis*. [See SKIN.]

SCARIFICA'TION (*scarificatio*: *Lat.*), in Surgery, the operation of making several incisions in the skin, with a lancet or a cupping instrument.

SCARLATI'NA, in Medicine, the *scarlet fever*. It is a highly contagious disease, and assumes two forms. The one comes on with languor, chills, and the usual symptoms of fever. On the third or fourth day there appears a scarlet efflorescence on the skin, which ends, in three or four days, by the skin peeling off in brawny scales; the febrile symptoms, and sore throat, if there had been any, disappear; and the patient gradually recovers—a dropsical swelling, which lasts but a short time, sometimes following the disease. In the other form, the febrile symptoms are more serious; there is bilious vomiting; great soreness and ulceration of the throat; and the eruption, instead of mitigating the symptoms, is accompanied by their dangerous increase. The body becomes swollen, the nose and eyes inflamed, the breath fetid, and the inflammation of the throat terminates in greyish sloughs. If the patient recover, dropsical swellings and glandular tumours follow, and leave his state very precarious. This disease occasionally assumes a highly malignant form. Scarlet fever is known from *measles*, by the greater extent, and want of elevation, of the eruption; and by its not assuming the form of semilunar patches. Besides, there is no cough, nor the running from the eyes and nose, with which measles begin.

SCAR'LET-OAK, in Botany, the *Quercus coccifera*, or kermes oak, producing small glandular excrescences, called *kermes* or *scarlet-grain*, which are used for dyeing scarlet.

SCARP, in Fortification, the interior talus or slope of the ditch next the place at the foot of the rampart.——In Heraldry, the scarf which military commanders wear for ornament.

SCENE (*Fr.*, from *skēnē*: *Gr.*). In the drama this word has four significations: its first, or primitive, denotes a theatre, in accordance with its meaning (a tent, or booth); its second, the decoration of a theatre, as the painting exhibited between the acts; its third, a scene representing the place in which an action is performed, as a room or a garden; and its fourth, that portion of a drama which belongs to the same person or persons, in one place.

SCENOG'RAPHY (*skēnographia*; from *skēnē*, a scene; and *grapho*, I write: *Gr.*), in Perspective, opposed to Ichnography and Orthography. *Ichnography* is the ground-plan; *orthography*, the elevation or a flat view of a front of an object; and *scenography*, the perspective view, which takes several sides, and represents everything in its apparent proportions.

SCEP'TICISM (*skeptomai*, I examine: *Gr*) —called also *Pyrrhonism* from its founder Pyrrho, who lived under Alexander the Great —the doctrine of a sect of philosophers, who maintained that no certain inferences can be drawn from the senses, and who therefore doubted of everything [See PHILOSOPHY.]

SCEP'TRE (*skēptron*; from *skēpto*, I lean upon: *Gr.*), a short staff, the emblem of sovereign power. It is an ensign of royalty of greater antiquity than the crown. It was at first an unornamented staff, or baton; but became, afterwards, covered with ornaments in ivory, gold, &c. At present, the sceptre and ball form the two most important emblems of royal and imperial power.

SCHED'ULE (*Fr.*; from *schedula*, a small piece of paper: *Lat.*), in Law, a scroll of paper or parchment appended to a will or deed. Also a list of names or things.

SCHE'LIUM, or **SCHEE'LIN**, in Mineralogy, another name for *tungsten*; given to it in honour of Scheele, its discoverer. [See TUNGSTEN.]

SCHE'RIF (lord, or master: *Arab*), a title given, in the east, to those who are descended from Mahomet, through his daughter Fatima and son-in-law Ali. They are called also *Emir*, and *Seid*, and have the privilege of wearing green.

SCHERO'MA (*scheros*, dry: *Gr.*), in Medicine, a dryness of the eye, from a want of the lachrymal fluid.

SCHE'SIS (*Gr.*), in Medicine, an appellation designating the general state or disposition of the body or mind.——In Rhetoric, a figure of speech in which a certain affection or inclination of the adversary is feigned, on purpose to be answered.

SCHIL'LER-SPAR (*schillern*, to change colours: *Ger.*), a mineral of a pearly lustre, and changeable hues.

SCHISM (*schisma*; from *schiso*, to cleave: *Gr.*), in a theological sense, a division or separation in a church or society of Christians; or breach of unity among people of the same religious persuasion. Hence, one who separates from an established church or religious faith is termed a *schismatic*.

SCHIST (*schistos*, cloven: *Gr.*), in Geology, various rocks composed of crystalline materials, arranged in layers, are termed schists. The principal kinds are *Mica-schist*, a very abundant rock, composed of quartz and mica; *Hornblende-schist*, usually black, composed of hornblende and felspar, the former predominating; *Chlorite-schist*, a green slaty rock, abounding with foliated plates of chlorite; *Talcose-schist*, composed of talc and quartz, or talc and felspar. All these belong to what is called the metamorphic series [see GNEISS], and some of them are found in all mountainous regions, usually in the neighbourhood of granite and gneiss. A *schistose* rock means a rock that splits like slate in laminæ, more or less thin.

SCHOLAS'TICS (*scholastikos*; from *scholē*, leisure: *Gr.*), a class of philosophers or *schoolmen*, who arose in the middle ages, and taught a peculiar kind of philosophy; which consisted in applying the ancient dialectics to theology, and intimately uniting both. On account of the excessive subtility which prevailed in the scholastic philosophy, the expression *scholastic* has been used for the extreme of *subtility*. After the Reformation and the revival of letters, the system gradually declined, till it gave place to the enlightened philosophy of Lord Bacon and the great men who have followed in his track and carried out his principles.

SCHO'LIA (*scholion*, a comment; from *scholē*, leisure: *Gr.*), notes or annotations on an ancient author.——SCHOLIAST, one who writes *scholia*, for the purpose of illustrating ancient authors.

SCHOOL (*scole*: *Sax.*; from *scholē*: *Gr.*). In modern usage the word *school* comprehends every place of education, whether a college, an academy, a primary school, or a school for learning any single art or accomplishment. The changes which have taken place in science, and in the whole condition of modern nations, who are no longer dependent, like those of the middle ages, for their means of intellectual culture, on the remains of ancient civilization, necessarily make the character of school instruction very different from what it was formerly, when the whole intellectual wealth of Europe was contained in two languages; and though these noble idioms will always retain a high place in a complete system of education, yet their importance is comparatively less; while that of the natural sciences, history, geography, politics, &c. has very much increased. All this has had a great influence upon schools, and will have a still greater. The importance of education, moreover, is now set in strong relief by the general conviction, entertained in free countries, that a wide diffusion of knowledge is the only true security for well-regulated liberty, which must rest on a just sense of what is due from man to man. And few results can be attained by the student of history and of mankind more delightful than this of the essential connection of light and liberty; not that great learning necessarily leads to liberty; history affords many instances which disprove this; but that a general diffusion of knowledge always tends to promote a general sense and love of what is right and just, as well as to furnish the means of securing it.——SCHOOL, among painters, the style and manner of painting common to the great masters of the art at any particular period, as the Italian, Flemish, Dutch, Spanish, and English schools.——SCHOOL, in Philosophy, a system of doctrine delivered by particular teachers, as the *Platonic school*, the *school of Aristotle*, &c.——SCHOOL, in the middle ages, a seminary for teaching logic, metaphysics, and theology, characterized by academical disputations and subtilties of reasoning. Hence *school divinity* is the phrase used to denote that theology which discusses nice points, and proves everything by argument.

SCHOON'ER, a small sharp-built vessel, with two masts; of considerable length and rake; with small top masts, and fore and aft sails. It carries a square topsail, and top-gallant sail.

SCIAG'RAPHY, or SKIOG'RAPHY (*skia*, a shadow; and *grapho*, I write: *Gr.*), in Architecture, a profile or section of a building to exhibit its interior structure.——In Astronomy, the art of finding the hour of the day or night, by the shadows of objects, caused by the sun, moon, or stars.——In Painting, the art of delineating shadows on mathematical principles.

SCIAT'IC (*sciatique: Fr.; from ischion*, the hip-joint: *Gr.*) *Artery*, in Anatomy, a branch of the internal iliac.——*Sciatic Nerve*, a branch of a nerve of the lower extremity, formed by the union of the lumbar and sacral nerves.——*Sciatica*, a painful affection of this nerve.——*Sciatic Vein*, the vein which accompanies the sciatic artery in the thigh.

SCI'ENCE (*scientia; from scio*, I know: *Lat.*), the regular development of any branch of knowledge. The difference between science and art is, that the first is speculative, and the second practical. Science deals with principles, art with their application. Facts do not constitute science, though they are its foundation, and material science consists in the systematising of facts under general laws.

SCIL'LA (*skilla: Gr.*), in Botany, a genus of plants, nat. ord. *Liliaceæ*. The species are bulbous, and consist of the different varieties of the *Squill*.

SCI'ON (*Fr.; from scindo*, I cut asunder: *Lat.*), a graft or young shoot of a tree.

SCIOP'TICS (*skiæ*, a shadow; and *opsomai*, I shall see: *Gr.*), the science of exhibiting images of external objects received through a double convex glass in a darkened room.——*Scioptic*, a sphere or globe of wood with a hole in which is placed a lens, so constructed that it may be turned round every way, and used in making experiments with the camera obscura.

SCI'RE FA'CIAS (*Lat.*), a judicial writ founded on some matter of record, as judgments, and letters patent, on which it lies to enforce the execution of them or to set them aside. It is so called because the writ directs the sheriff that he give knowledge (*quod scire facias*) to the defendant respecting the matter in hand. The most usual application of this writ is for repealing letters patent, for enforcing judgments against individual shareholders of certain joint-stock companies when the assets of the company are insufficient to satisfy the debt.

SCIU'RUS (*Lat.; from skiouros; skia*, a shadow; and *oura*, a tail: *Gr.*—on account of its large tail), in Zoology, a genus of rodent mammalia, known as squirrels.

SCLAVO'NIAN, or SCLAVON'IC, pertaining to the *Sclavi*, or their language—a people that anciently inhabited the country between the rivers Save and Drave. Hence the word came to denote the language which is now spoken in Poland, Hungary, Bohemia, &c. The Sclavonic languages may be thus classed; in the east are the Russian, the Bulgarian, and the Illyrian, the last comprehending the Servian and Croatian dialects. The Bible was translated into the ancient Bulgarian in the middle of the ninth century, and this is said to be still the authorized version for the whole Sclavonic race. In the west we find the languages spoken in Poland, Bohemia, and Lusatia; the last spoken by the Wends.

SCLEROT'ICA (*skleros*, hard: *Gr.*), in Anatomy, one of the tunics or coats of the eye; it is hard, opaque, and extended from the cornea to the optic nerve; its anterior part, which is transparent, is called the *cornea*.——Medicines which harden and consolidate the parts to which they are applied are termed *sclerotics*.

SCOL'OPAX (*skolopax*, a woodcock: *Gr.*), in Ornithology, a Linnæan genus of birds, including the woodcock and the snipe.

SCOLOPEN'DRA (*Gr.*), the generic name for the *Centipedes*, a genus of carnivorous *Annulosa*, belonging to the *Myriapoda*. [See CENTIPEDE.]

SCOM'BER (*skombros: Gr.*), in Ichthyology, a genus of fishes including the *mackerel*, which see.

SCORE, in Music, the original draught of the whole composition, in which the several parts are distinctly marked.

SCO'RIÆ (*skōria: Gr.*), in Metallurgy, the dross of metals in fusion; or, more strictly speaking, that vitreous mass which is produced in obtaining metals from their ores, and which when cold is brittle, and insoluble in water. Hence, *scoriaceous*, pertaining to dross; and *scorification*, the operation of reducing a body into scoria.

SCOR'PIO (*Lat.; from skorpios: Gr.*), one of the signs of the zodiac. When it rises *Orion* sets; and hence the fable that Orion died by the sting of a scorpion.——*Scorpio*, the name of an ancient military engine, used chiefly in defending the walls of a town. It resembled the balista in form; consisting of two beams bound together by ropes, from the middle of which rose a third beam, called the *stylus*, so disposed as to be pulled up and let down at pleasure. On the top of this were fastened iron hooks.——*Scorpio* was the name also of a sort of scourge, which was furnished with small spikes that lacerated the body of the sufferer.

SCOR'PION (same *deriv.*), in Zoology, a genus of *Arachnida*, distinguished from spiders, by having the abdomen articulated, and the tail tenuated by a curved sting, beneath the extremity of which are two orifices that discharge a poisonous fluid. The scorpion is not unlike a lobster in appearance; it is found in the south of Europe, where it seldom exceeds four inches in length; but in tropical climates it grows to the length of five or six inches. The sting of the larger kinds is much dreaded; and is sometimes fatal to life.

SCOT (*sceat*, part or portion, in the sense of contribution: *Sax.*), an old word signifying a customary contribution, laid upon all subjects according to their ability: and found in several expressions; thus, *scot-free*, &c. In Law, paying 'scot and lot' is understood to mean paying parochial rates. Formerly persons assessed to any contribution, though not by equal portions, were said to pay scot and lot.

SCOTIA (darkness: *Gr.*), in Architecture, a hollow moulding, so called from the shadow which was formed by it, and seemed to envelope it in darkness. From its resemblance to a common pulley, it is sometimes called a *trochilus*.

SCOT'ISTS, a sect of school-divines and philosophers, thus called from their founder, Duns Scotus, a Cordelier; who maintained the immaculate conception of the Virgin, or that she was born without original sin, in opposition to Thomas Aquinas, and the Thomists. The present pope has settled the question, by making the opinion of Scotus an article of Roman Catholic faith.

SCREW (*écrou: Fr.*), one of the six mechanical powers, consisting of a spiral thread or groove cut round a cylinder. When the thread is on the outside it is a *male* or convex screw; but when it is cut along the inner surface of the cylinder it is a *female* screw, otherwise called a nut. The screw is reducible to an inclined plane; and its efficiency is increased by diminishing the distance between the threads, which is equivalent to diminishing the *height* of the plane; or by increasing its diameter, which is the same as increasing the length of the plane. [See INCLINED PLANE.]——ARCHIMEDEAN SCREW, in Hydraulics, a spiral tube arranged as a spiral and turned on an axis; it is employed for raising water; so called from its inventor Archimedes.——ENDLESS SCREW, a wheel turned by a screw, which, as it never ceases to be in contact with some of the teeth of the wheel, is practically endless.

SCREW PINES, a genus of tropical trees of remarkable appearance, more nearly allied to palms than to other plants. A mealy substance is obtained from the seeds, which is eaten. 'Wondering at the capricious vagaries of nature, the traveller contemplates these extraordinary trees, which have leaves arranged in spiral order, like the dragon trees, trunks like those of palms, fruit-cones like the conifers, and yet having nothing in common with any of these plants, so that they form a family by themselves (*Pandanaceæ*). On one of the Nicobar islands we saw some of these trees with slim smooth stems forty to fifty feet high, which are nourished by and supported upon a pile of aerial roots ten or twelve feet high, resembling a conical piece of wicker work. Many of the roots did not reach the soil. From the branches depended beautiful massy fruit cones, a foot and a half in length, by one in thickness, which when ripe are of a bright orange hue.'—*Voyage of the Novara.*

SCREW PROPEL'LER, sometimes, but improperly, termed an Archimedean screw. An instrument for propelling vessels. It consists of two or more blades, somewhat like the vanes of a windmill, fixed on an axis running parallel to the keel of a vessel, and revolving under water at the stern—a water-tight opening being made for its axis, or shaft, just inside the sternpost. It is driven by a steam engine, placed within the ship; and by screwing itself, as it were, into the water, presses the vessel before it. The threads of this screw must be greatly deeper than if it worked in metal or wood; and hence the blades are made of considerable width, and of a length nearly sufficient to react from the keel to the surface of the water. The latter is prevented from entering where the screw shaft passes out at the stern, by a *stuffing box.* Screw propellers are supposed to have been used by the Chinese for sculling vessels, from a very early period, and they were often proposed as a means of moving ships, in Europe, before they were actually used for that purpose. Different numbers, forms, and pitch of blades, have at various times been employed, but the most usual and simple propeller has only two blades. From experiments made on the subject, there is reason to believe that the screw is rather more advantageous than the paddle wheel, when the vessel is deep in the water; but the contrary when the immersion is light, or at a medium. Also, the *slip*, or backward motion of the water, which is so much power lost, is estimated at one-third of the distance run with paddle wheels; but at considerably less, with a propeller. Screw ships are not so well adapted to go *head to wind* as those with paddles; but they are more conveniently used as sailing vessels, should circumstances require them partly, or altogether, to depend on the wind; and they are less exposed to the violent effects of a storm or heavy sea. To be effective, the screw must revolve with considerable velocity. For let us suppose that the vessel is to move at the rate of ten miles per hour, or 880 feet per minute, with a propeller of twelve feet pitch, not taking the slip into account, it must make the twelfth part of 880, or 73 revolutions per minute, a speed much higher than that usually expected from marine engines. The velocity required is obtained either by increasing that which is derived from the engines, by means of a pinion on the screw shaft, and a wheel on the crank axle, or by suiting the construction of the engines to the attainment, at once, of the required speed—which seems the better mode of proceeding.

SCRIBE (*scriba:* from *scribo*, I write: *Lat.*), a principal officer in the Jewish law, whose business was to write and interpret scripture. Originally the scribes had their name from their employment, which was transcribing the law, and multiplying copies of it; but in time they exalted themselves into public ministers and expositors of it.

SCROPH'ULA (*Lat.*, literally a *dim.* of *scrofa*, a sow), in Medicine, a disease indicated by hard indolent tumours of the conglobate glands in various parts of the body, but particularly in the neck, behind the ears, and under the chin, which after a time suppurate and degenerate into ulcers. It was called by the Greeks *Choiras*, or swine's disease. It is not contagious, but hereditary; though, under favourable circumstances, it may be entirely dormant during a generation. It is most common among children of fair complexion, and inclined to rickets; and is favoured by damp and variable climates. It first appears between the third and seventh years, and rarely shows itself after puberty.

SCROPHULARIA'CEÆ, a nat. ord. of exogenous plants with monopetalous corollas and capsular fruit. Several of our well-known wild flowers belong to this order, for example, the foxglove, eyebright, toadflax, snapdragon, and mullein. It includes many handsome garden and conservatory plants, such as the species of Calceolaria, Antirrhinum, Pentstemon, Mimulus, Maurandya, and Veronica. Few of the species are of much use to man, but many contain a dangerous principle, which, however, in the case of the foxglove, is used medicinally under the name of Digitaline.

SCRU'TINY (*scrutinium*, a search: *Lat.*), in Law, an examination of suffrages or votes at an election, for the purpose of ascertaining whether they are good or not.——In the primitive church an examination of catechumens who were to receive baptism on Easter-day.

SCULP'TURE (*sculptura*, from *sculpo*, I carve: *Lat.*), the art of giving form and expression, by means of the chisel and other implements, to masses of stone or other hard substances, so as to represent figures of every description, animate and inanimate. It is supposed that sculpture had its origin from idolatry, as it was found necessary to place before the people the images of their gods to enliven the fervour of their devotion. But to form conclusions concerning the rise and progress of the arts and sciences, without the aid of historical evidence, by analogies which are sometimes accidental, and often fanciful, is a mode of reasoning which, at best, must ever be liable to suspicion. In whatever country the earliest attempts were made, the Egyptians were the first who adopted a certain style of art. Their works were gloomy and grave, but still they were full of deep sentiment, and connected, as would appear by the hieroglyphics which covered them, with poetry and history, and by the mummies, with the belief of immortality. Interesting as the subject would doubtless prove, it is far beyond our limited means to trace the progress of this beautiful art through all its stages in the classic days of Greece, till its decline in Rome, where, though all the treasures of the Grecian sculptors had been carried to deck the Roman capital, the art never became naturalized. During the long and gloomy interval of barbarism that succeeded the downfall of imperial Rome, sculpture, with the sister arts, lay dormant and forgotten. At length, however, through the genius of Michael Angelo Buonarotti, and the skill and perseverance of some of his distinguished successors, seconded by the patronage of the illustrious house of Medici, the treasures of antiquity were collected and modern art nobly tried to rival the grace and sublimity which existed in the ancient models. The sculptor's art, as Sir Joshua Reynolds observes, is limited in comparison of others, but it has its variety and intricacy within its proper bounds. Its essence is correctness; and when to correct and perfect form is added the ornament of grace, dignity of character, and appropriate expression, as in the Apollo, the Venus, the Laocoon, the Moses of Michael Angelo, and many others, this art may be said to have accomplished its purpose.

SCUP'PERS, or SCUPPER-HOLES (*Schæpen*, to draw off: *Belg.*), in a ship, channels cut through the water-ways and sides of a vessel at proper distances, and lined with lead for carrying off the water from the deck.——*Scupper-hose*, a leathern pipe attached to the mouth of the scuppers of the lower deck of a ship, to prevent the water from entering.

SCUR'VY (*scurf*, a dry scab: *Ang. Sax.*), in Medicine, a disease characterized by great debility, a pale bloated face, livid spots on the hands and feet, weakness in the legs, offensive breath, &c. The scurvy is a disease of a putrid nature, much more prevalent in cold climates than in warm ones; and it very generally arises from eating too much salt provisions. It has been found that in the cure of this disease much more is to be done by regimen than medicines. ——Fresh vegetables, farinaceous substances, brisk fermented liquors, good air, and proper exercise, have nearly banished it from the navy. The beneficial effect supposed to be caused by lemon juice and other acids has been rendered doubtful by recent researches.

SCUR'VY-GRASS, the *Cochlearia officinalis* of botanists, a British plant that grows on rocks near the sea, has an acrid, bitter taste, and, when eaten raw as a salad, is considered an excellent remedy for the scurvy.

SCU'TAGE (*scutum*, a shield: *Lat.*), in English history, a tax or contribution levied upon those who hold lands by knight-service.

SCUT'TLE (*scutella*, a nearly square salver: *Lat.*—which the lid of the hatchway resembles), a small hatchway or opening in the deck of a ship, large enough to admit a man, and with a lid for covering it; also a similar hole in the side of a ship, and through the covering of her hatchways, &c. ——To *scuttle the decks*, is to cut holes in them to let down water from them into the hold.——To *scuttle a vessel*, is to cut holes, for the purpose of sinking it.——*Scuttlebutt*, a cask of water, with a large hole in it, for the ship's use.

SCU'TUM (*Lat.*), in Antiquity, a sort of buckler of both a semicylindrical and an oval form; in the former case, it was termed *imbricatum*; in the latter, *ovatum*.

SCYL'LA (*Lat.*, from *skulla*: *Gr.*), a rock in the sea between Sicily and Italy, which was very formidable to the mariners among the ancients. It was opposite to the whirlpool Charybdis.

SCYTHE, an instrument for mowing. It consists of a thin steel blade attached at right angles to a handle of six or eight feet long. When used for cutting corn there is frequently an addition made to it, called a **cradle**.

SEA (*Sæ*: *Sax.*), in Geography, a term sometimes applied to the ocean, or that vast tract of water encompassing the whole globe; but, more properly, to a particular part or division of the ocean; as the Irish Sea, the Mediterranean Sea, the Red Sea, the Sea of Marmora, the Black Sea, the Baltic, &c. [See OCEAN.]

SEA-ANEMONES, the popular name of marine polypes belonging to the family of *Actinidæ*. They are of gelatinous or fleshy substance, more or less cylindrical in shape, with a base usually attached to a rock or other body. At the upper end is a disk, in the middle of which is the mouth leading to the stomach. The remains of the food, after digestion, are ejected again by the mouth. Upon this disk are placed rows of tentacles, threadlike bodies, capable of extension and contraction, by means of which these animals seize their prey. These tentacles somewhat resemble the stamina of a flower, and have suggested the popular name. They are furnished with weapons in the shape of minute darts, that seem to possess the property of poisoning, and these they can project at will. They have no special organs of sense, nor has any nervous system been discovered. Some of the sea-anemones increase by spontaneous division, others by budding. In some the sexes are united in one individual; in others they are separate. Their eggs, after having been hatched, have a resemblance to the infusoria, and are freely locomotive by means of cilia. In this state they usually issue from the body of the parent; but sometimes they are developed into perfect animals before they come forth.

SEA-CALF, in Zoology, the *seal*, which see.

SEA-DEVIL, a name given by seamen to a large cartilaginous fish, of the *Ray* kind. It is also applied to the Angler, the *Lophius piscatorius* of Linnæus. [See LOPHIUS.]

SEA-GULL. [See GULL.]

SEA-HEDGEHOG. [See ECHINUS.]

SEA-HOLLY, a British umbelliferous plant, *Eryngium maritimum*, which grows near the sea, and has blue flowers.

SEA-HORSE, in Zoology, the Morse or Walrus; also the *Hippocampus*, which see.

SEA-KAIL, or SEA-CALE, a plant of the genus *Crambe*. The whole plant is entirely smooth and glaucous; the stems are about two feet high and branching, bearing fleshy leaves, some pinnatifid, and others sinuate, undulate, and crisped. It is now very common, though its introduction into gardens as a culinary vegetable is but of recent date. It should be planted in a deep sandy soil, and blanched either by sand, ashes, litter, or by covering with flower pots. No plant is so easily forced; and, unlike asparagus, it yields produce the first spring after being raised from seed.

SEA-LION, the *Phoca jubata*, a species of seal, the male of which has a large mane on the neck.

SEAL (*sele*: *Sax.*), the *Phoca vitulina* of zoologists, a four-limbed marine mammal, found abundantly on the coasts of Labrador and Newfoundland; and not unfrequently on the British shores. The hind feet are placed at the extremity of the body, in the same direction with it, and serve the purpose of a caudal form; the fore feet also are adapted for swimming. The limbs would rather resemble fins than feet, if they had not sharp strong claws. Seals are from four to six feet in length; they are covered with short, stiff, glossy hair, with a smooth head without external ears, and the fore legs are deeply immersed in the skin. They are gregarious; and their companions come to their assistance if attacked. Their courage, however, only enables the fisherman to increase his booty The seal not only furnishes food for the Esquimaux's table, oil for his lamp, and clothing for his person; but even the bones and skin supply materials for his light portable boats and his summer tents. It has been remarked that the brain of this animal is of greater proportionate magnitude than that of any quadruped; and that not only does it exhibit in its countenance the appearance of sagacity, but its intelligence is in reality far greater than in most land animals. Dr. Harwood observes, that, aware of its disposition to become familiar, and its participation in the good qualities of the dog, it is astonishing that mankind have not chosen this intellectual and finely-organized quadruped, for aquatic services scarcely less important than some of those in which the dog is employed on land. There are several species of seal besides the one named above. The operation of taking seals and curing their skins is called *sealing*; and a voyage made for that purpose is called a *sealing-voyage*.

SEAL, in Law, the impression or device printed on wax, which is put to any deed by way of ratification. The *great seal* is the seal used for the united kingdom of England and Scotland, and sometimes of Ireland. The *privy seal* is that which the king uses to such grants, &c., as are to pass the great seal.——**SEAL**, a piece of metal having coats of arms or some other device engraven upon it; also the print in wax made by the seal.

SEAL'ING-WAX (*sigillum*, a seal: *Lat.*), a composition of gum lac, melted and incorporated with resin, to which some pigment is added to give it the required colour, as vermillion, ivory black, verditer, &c. Gold sealing-wax is made simply by stirring gold-coloured mica spangles into the melted resin. Sealing-wax is an article that is now comparatively but little used, on account of the very general adoption of adhesive envelopes.

SE'AMAN, one engaged in navigating ships or other vessels upon the high seas. An *able seaman* is one who is complete in his profession; an *ordinary seaman*, one who is less competent; and a *landsman*, one who is fresh from shore. Various regulations have been enacted with respect to the hiring of seamen, their conduct, and the payment of their wages.

SE'AMANSHIP, an acquaintance with the art of managing and navigating a ship; applicable both to officers and the men, and indispensably necessary in those who have the ship under their command.

SE'A-MEW, a name given to some of the gulls.

SE'A NEEDLE. [See GARFISH.]

SE'A-OTTER, the *Enhydra lutris*, a species of otter that has hind feet, resembling the seal. It feeds on shell-fish.

SE'A-PIE, the *Hæmatopus ostralegus* of ornithologists, a wading bird allied to the plover; called also the oyster-catcher, from its thrusting its beak into oysters when open, and taking out the fish.

SE'A-SERPENT. At various times, within the last quarter of a century, marvellous accounts have been published regarding an enormous marine animal seen on the coasts of America, of a size and length varying according to the opinions of those who assert that they have seen it; some describing it as 100 feet long, while others make it nearly as many yards. All accounts, however, agree as to the protuberances on its back, its vertical sinuosities, and its serpent-shaped head. It is highly probable that pieces of wrecks, seaweed, or some other objects, seen from a distance, have been mistaken for living bodies; and their size exaggerated by the fertile imagination of seamen. [See KRAAKEN.]

SEA-SICKNESS, a disorder incident to most persons on their first going to sea, occasioned by the agitation of the vessel. Though it continues in general only for the first day or two, it is extremely harassing to some people at intervals, especially on any increased motion of the vessel; and with many it lasts the entire voyage, however long, at least at any rising of the sea. No good remedy has yet been found for it; perhaps the most effective is lying on the back in a horizontal position; but this must not be too long persevered in, lest the sufferer become incapable of exertion during the voyage. After a day or two, the patient must exert himself, however difficult the effort may be at first; and then, with a little exposure to the fresh air, &c., comparative comfort will be generally secured for the rest of the time. The ancient writers recommend acid fruits, or bread and vegetables soaked in vinegar, after the stomach has been cleansed by vomiting, but not before. An old remedy for sea-sickness, and a very common one among sailors, is a draught or two of sea-water; which though disagreeable enough, particularly at such a time, has been found to produce the desired effect. But there are many simple remedies which prove useful enough in a short voyage, that are ineffective or inadmissible in a long one. Some do not during their entire lives, however trying the circumstances, experience the least tendency to this most painful and overpowering malady.

SE'ASONS (*saisons*: *Fr.*), the four divisions or portions of the year, namely, Spring, when the sun enters Aries; Summer, when he enters Cancer; Autumn, when he enters Libra; and Winter, when he enters Capricorn. Hence Spring is supposed to commence about the 21st of March; Summer, about the 22nd of June; Autumn, about the 23rd of September; and Winter, about the 23rd of December. The diversity of the seasons depends upon the oblique position of the sun's path through the heavens; in consequence of which this luminary rises to different heights above the horizon, making the day sometimes longer, and sometimes shorter, than the nights. When the sun rises highest at noon, its rays fall most nearly in the direction of a perpendicular, and consequently a greater number is received upon a given spot; their action also, at the same time, continues the longest. These circumstances make the difference between summer and winter. It is found that the sun does not rise so high in summer, nor descend so low in winter, at the present time as it did formerly; in other words, the obliquity of the ecliptic, which is half the difference between the sun's greatest and least meridian altitudes, is growing less and less continually. But there is no doubt that this diminution will never exceed a certain small quantity; and that after a period, not ascertained by astronomers, the obliquity will begin again gradually to increase. [See EQUATOR.]

SE'A-URCHIN. [See ECHINUS.]

SE'A-WOLF. [See WOLF-FISH.]

SEBA'CEOUS GLANDS (*sebum*, grease: *Lat.*), in Anatomy, small glands seated in the skin, which secrete a fatty matter.

SEBA'CIC ACID (same *deriv.*), an acid obtained by the destructive distillation of fatty substances. It forms small pearly crystals.

SEBES'TEN, the drupaceous fruit of some trees belonging to the genus *Cordia*, which grow in tropical Asia and Africa.

SE'CANT (*secans*, cutting: *Lat.*), in Geometry, a line that cuts another, or divides it into two parts. The *secant of a circle* is a line drawn from the circumference on one side, to a point without it on another.——In Trigonometry, a *secant* is a right line drawn from the centre of a circle, which, cutting the circumference, proceeds till it meets with a tangent to the same circle.

SEC'OND (*Fr.; from secundus*, subordinate: *Lat.*), in Geometry, Chronology, &c., the sixtieth part of a minute, whether of a degree, or of an hour; it is denoted by two small accents, thus (″).——In Music, an interval of a conjoint degree, being the difference between any sound and the next nearest sound above or below it.——*Second*, one who attends another in a duel to aid him, and see that all the proceedings between the parties are fairly conducted.——*Second terms*, in Algebra, those where the unknown quantity has a degree of power less than it has in the term where it is raised to the highest.

SEC'ONDARY ROCKS (*secundarius*, belonging to the second class: *Lat.*), in Geology, the series of formations which intervene between the primary rocks and the tertiary, including the Triassic or upper new red sandstone group (which rest upon the Permian or magnesian limestone group, the uppermost portion of the primary division), the liassic, oolitic, and cretaceous groups. There is so marked a difference between the fossils of this series, and those of the earlier and later series, as to induce geologists to believe that an indefinite series of ages elapsed between them.——*Secondary circles*, in Astronomy, circles passing through the poles of some great circle; thus the meridians and hour circles are secondaries to the equinoctial. There are also *secondaries* passing through the poles of the ecliptic, by means of which all stars are referred to the ecliptic.

SECOND SIGHT, a superstitious notion, prevalent in the Highlands of Scotland, by which certain persons are supposed to be gifted with a kind of supernatural sight; or the power of seeing future or distant events as if they really happened.

SEC'RETARY (*secretaire: Fr.; from secretus*, private: *Lat.*), an officer whose duty it is to write letters and other instruments, for and under the orders and authority of a public body or an individual.——*Secretary of State*, in British policy, an officer of the crown who transacts and superintends the affairs of a particular department of government. There are five principal secretaries of state. The secretary for the Home Department, the Colonial Secretary, the secretary for Foreign Affairs, the secretary for the War Department, and the secretary for India; each having a salary of 6000*l.* per annum. In each of these departments there are two under secretaries, one of whom remains in office when the ministry goes out. The principal secretaries are always ex officio cabinet ministers, and members of the privy-council; and have authority to commit persons for treason, and other offences against the state; being ex officio conservators of the peace at common law, or justices of the peace throughout the kingdom.

SECRE'TION (*secretio*, a separation: *Lat.*), the process by which a gland or set of vessels in the animal system changes a fluid of one quality into a fluid of another quality. The organs of secretion in the animal economy are of very various form and structure; but the most general are those denominated *Glands*, which see.

SECT (*secta; from seco*, I cut off: *Lat.*), a body of persons adhering to some philosophical or religious system. Most sects have originated in a particular person, who taught and propagated some peculiar notions in philosophy or religion, and who is considered to have been its founder.

SECTA'RIAN (same *deriv.*), one of a party in religion which has separated itself from the established church; or which holds tenets different from those of the prevailing denomination in a kingdom or state.

SEC'TILE (*sectilis*, that may be cut: *Lat.*), a term for a mineral that is soft enough to be easily cut.

SEC'TION (*sectio*, a cutting off: *Lat.*), in general, denotes a distinct part or portion of something which is divided; or the division itself. Such are the subdivisions of a chapter, called also paragraphs and articles.——*Section*, in Geometry, a side or surface of a body or figure cut off by another; or the place where lines, planes, &c., cut each other.——*Section*, in Drawing, the representation of the interior of a building or a machine, on the supposition that it has been cut through in some given direction.

SEC'TOR (*secteur: Fr.; from seco*, I cut off: *Lat.*), in Geometry, a part of a circle comprehended between two radii and the arch; or a mixed triangle, formed by two radii and the arch of a circle.——A mathematical instrument so marked with lines of sines, tangents, secants, chords, &c., as to fit all radii and scales; and be useful in finding the proportion between quantities of the same kind.

SEC'ULAR (*secularis*, pertaining to the age: *Lat.*), something that is temporal, in which sense the word stands opposed to *ecclesiastical*; thus we say, secular power, secular jurisdiction, &c. Among Roman Catholics, *secular* is more peculiarly used for an ecclesiastic who lives at liberty in the world, not confined to a monastery, nor bound by the special vows or subjected to the particular rules of any religious community; in which sense it stands opposed to *regular*. Thus we say, the *secular* clergy, and the *regular* clergy.——The act of rendering secular the property of the clergy is called *secularization*.

SEC'ULAR GAMES (*ludi seculares*), in Antiquity, solemn games held among the Romans, notwithstanding their name, at no stated period. They lasted three days and three nights, during which time sacrifices were performed, theatrical shows exhibited, with combats, sports, &c., in the circus. They are said to have been instituted at Rome by Valerius Publicola—the first consul created after the expulsion of the kings. At the time of the celebration of the secular games, heralds were sent throughout the whole empire, to intimate that every one might come and see those solemnities, which he never yet had seen, nor would ever see again.

SECUN'DUM AR'TEM (*Lat.*), according to the rules of art.——In Medicine, a term fre quently used in prescriptions to denote that the recipe must be made up with particular care.——*Secundum naturam*, according to the course of nature.

SECUTO'RES (*Lat.*; from *sequor*, I follow), in Antiquity, a description of gladiators among the Romans, who fought aganst the *retiarii*. The *secutores* were armed with a sword and a buckler, to keep off the net or noose of their antagonists; and they also wore a casque. This name was also given to such gladiators as took the place of those killed in the combat, or who fought the conqueror.

SED'ATIVES (*sedatio*, an assuaging: *Lat.*), medicines which have the power of diminishing animal energy without destroying life. They generally induce sleep; and diminish irritability.

SE DEFENDEN'DO (in self defence: *Lat.*), in Law, a plea used for one who is charged with the death of another, by alleging that he was under a necessity of committing the act in his own defence.

SEDGES (*secg*: *Sax.*), an extensive order of grass-like plants, the *Cyperaceæ* of botanists. They are easily distinguished from grasses by having the stem destitute of joints. The roots are perennial and fibrous; the leaves hard and rough on the edge. They are found in all soils, but the greater proportion grow in marshes. The papyrus of the Nile, and the cotton grass of Britain, belong to this order.

SEDI'TION (*seditio*: *Lat.*), in Politics, a more or less organized resistance to the laws, or the administration of justice, and in disturbance of the public peace. In general, it signifies a local or limited opposition to *civil* authority; a commotion of less extent than an *insurrection*, and consequently less than *rebellion*.

SED'LITZ, or SEID'LITZ WATER, a mineral water, obtained from a village of that name in Bohemia. The waters are saline and purgative, limpid, sparkling, and of a bitter and salt taste; being composed principally of the sulphates of magnesia and lime, and carbonic acid.——*Seidlitz powders* are intended to produce a similar effect, though their composition is different. They are generally sold in blue and white papers; a blue paper contains two drachms of tartrate of soda, with two scruples of bicarbonate of soda; the white paper thirty-five grains of finely powdered tartaric acid. The contents of the former are to be dissolved in half a pint of water, that of the latter in a separate wine glass full; the solutions are to be mixed, and the mixture taken while effervescing.

SEED, the fecundated mature ovule of a plant, containing the embryo, or germ of a new plant. In order that the ovule should become capable of producing a plant, its fertilization by means of the pollen is necessary. When this has been done certain changes take place, the ovule enlarges and hardens, until the seed is ripe. It may then be separated from the parent plant, and if placed in favourable circumstances its embryo grows into a new plant, capable in its turn of producing seeds. The seeds of the great majority of plants are enclosed in a seed-vessel or pericarp. Such plants are termed *angiospermous* (*aggeion*, a vessel; *sperma*, a seed: *Gr.*). Seed vessels have great variety of form. [See BACCA, CAPSULE, DRUPE, FOLLICLE, LEGUME, NUT, PEPO, SILIQUA]. There are, however, some plants, such as those of the coniferous order, which have seeds that are destitute of a covering vessel, and these are termed *gymnospermous* (*gumnos*, naked: *Gr.*). A seed consists of an external skin, separable into several membranes, and the embryo. The latter is frequently surrounded by a deposit of solid matter, consisting of starchy and nitrogennous compounds, and called albumen or perisperm, which varies in its nature, and sometimes is so loaded with oil that the latter is expressed as an article of commerce. The embryo is composed of the *plumule* or *gemmule*, which on expanding becomes the stem of the new plant, the *radicle* which descends into the soil and becomes the root, and the *cotyledons* or rudimentary leaves, which usually differ from those subsequently put forth. [See COTYLEDONS.] Seeds differ much in size and external appearance. Sometimes the skin is polished and prettily coloured, as in French beans; others are rough, or pitted, or hairy, as in the cotton; the hairs of the seeds, in this case, yielding the cotton of commerce. As to the vitality of seeds after a lapse of time, the statement of the germination of wheat obtained from Egyptian mummies is now generally doubted, the proof not being clear that the seeds experimented upon really came from the mummies. Professor Henslow says, that in the fens of Cambridgeshire, after the surface has been drained, and the soil ploughed, large crops of white and black mustard invariably appear. Millar mentions a case of *Plantago Psyllium* having sprung from the soil of an ancient ditch which was emptied at Chelsea, although the plant had never been seen in the memory of man. De Candolle says, M. Girardin succeeded in raising kidney beans from seeds at least 100 years old, taken out of the herbarium of Tournefort.

SEEL'ING (*ciller*, to wink: *Fr.*), in Falconry, the running of a thread through the eye-lids of a hawk when first taken; so that she may see very little, or not at all; to make her the better endure the hood.

SEG'MENT (*segmentum*; from *seco*, I cut off: *Lat.*), in Geometry, any part cut from a figure by a line or plane.——*Segment of a circle*, a part cut off by a chord, or that portion comprehended between an arc and a chord. Segments of different circles are semicircular, when their arcs contain the same number of degrees.

SEIGN'IORAGE (*seigneur*: *Fr.*, from *senior*, an elder: *Lat.*), a royal right or prerogative of the kings of England, by which they claim an allowance of gold and silver brought in the mass to be exchanged for coin.

SEIS'MOLOGY (*seismos*, an earthquake; *logos*, a discourse: *Gr.*), a science constructed from the study of earthquake phenomena.

SEISMOM'ETER (*seismos*, an earthquake; and *metron*, a measure: *Gr.*), an instrument for measuring the shock of earthquakes, and other violent concussions.

SE'IZIN, or **SE'ISIN** (*saisir*, to seize: *Fr.*), in Law, possession. Seizin in *fact*, or *deed*, is actual or corporal possession; seizin in *law*, is when something is done which the law accounts possession or seizin, as enrolment; or when lands descend to an heir, but he has not yet entered on them. In this case the law considers the heir as *seised* of the estate, and the person who wrongfully enters on the land is accounted a *disseizor*.

SELE'NIATE, in Chemistry, a compound of selenic acid with a base.

SEL'ENITE, in Mineralogy, foliated or *crystallized sulphate of lime*. There are two varieties, massive and acicular.

SELE'NIUM (*selēnē*, the moon: *Gr.*), an elementary substance, obtained from a copper-mine at Fahlun, in Sweden. It bears a strong resemblance to sulphur, with which it is found associated in some varieties of iron pyrites. It is brittle, and opaque, with an imperfect metallic lustre, tasteless and inodorous; somewhat of the appearance of lead, but, when reduced to powder, of a deep red colour. Its spec. grav. is about 4·3. It becomes soft and tenacious at 212°, perfectly liquid at 220°, boils and sublimes at 650°. It is not soluble in water, nor altered in air. Oxidized under the blow pipe, it emits a strong disagreeable odour. It forms three combinations with oxygen, two of them being acids.

SELENIU'RET, in Chemistry, the compound of selenium with some other substance.

SELENOG'RAPHY (*selēnē*, the moon; and *grapho*, I write: *Gr.*), a description of the surface of the moon; as geography is a description of that of the earth.

SELEU'CIDÆ, ÆRA OF, or the Syro-Macedonian æra, is a computation of time, commencing from the establishment of the Seleucidæ, a race of Greek kings, who reigned as successors of Alexander the Great, in Syria, as the Ptolemies did in Egypt. This era is mentioned in the book of the Maccabees, and on a great number of Greek medals, struck by the cities of Syria, &c. The Rabbins call it the *æra of contracts*, and the Arabs the *æra of the two horns*. According to the best accounts, the year 312 of the era of the Seleucidæ began on the 1st of September in the Julian year preceding the first year of our era. Hence, to reduce a Macedonian date to the common era, subtract 311 years and 4 months.

SELT'ZER WATER, or more accurately *Selters water*, a mineral water from Selters, about ten miles from Frankfort-on-the-Maine. It contains a quantity of free carbonic acid, with common salt, and the carbonates of lime, magnesia and soda.

SEMAPHORE (*sēma*, a sign; and *phero*, I bear: *Gr.*), a term nearly synonymous with *telegraph*.

SEME' (sown: *Fr.*), in Heraldry, a term used to indicate a field or charge powdered or strewed over with figures, such as stars, crosses, &c.

SEMEIOT'ICS, or **SEMEIOL'OGY** (*semeiōtikos*, portending; *sēmeion*, a sign; and *logos*, a discourse: *Gr.*), the doctrine of signs; terms used in medical science to denote that branch of it which teaches how to judge of all the symptoms in a human body, whether it is in a state of health or disease.

SEM'I (*Lat.*), a prefix, signifying *half*; as *semicircle*, half a circle, &c.

SEMI-AMPLEX'ICANT (*Lat.*), in Botany, embracing the stem half way, as a *semi-amplexicant leaf*.

SEM'IBREVE, half a *breve* (*semi*, half; and *amplexo*, I embrace: *Lat.*), in Music, the note by which all others are regulated. It contains the time of two minims, which are divided either into four crotchets, eight quavers, sixteen semiquavers, or thirty-two demi-semiquavers.

SEM'ICOLON (*semi*, half: *Lat.*; and *kolon*, the member of a sentence: *Gr.*), in Grammar and Punctuation, the point [;] the mark of a pause to be observed in reading, of less duration than the colon, double the duration of the comma, or half the duration of the period. [See PUNCTUATION.]

SEMI-COLUM'NAR, flat on one side, and round on the other; a term of botany, applied to a stem, leaf, or petiole.

SEMI-DIAM'ETER, in Geometry, a right line drawn from the centre of a circle or sphere to its circumference or periphery; a *radius*.

SEMI-DIAPA'SON, in Music, a defective octave, or an octave diminished by a minor semitone.

SEMI-DIATES'SARON, in Music, an imperfect or defective fourth.

SEM'I-DITONE, in Music, a lesser third.

SEM'I-METAL, a term applied by the older chemists to metals which were brittle, such as zinc, &c.

SEM'INARY (*seminarium*; from *semen*, seed: *Lat.*), in Gardening, a seed-plat, or place for raising plants, and keeping them till they are fit to be removed into the garden or nursery.——Any place of education, in which young persons are instructed in the several branches of learning.

SEMINA'TION (*seminatio*: *Lat.*), the natural manner of shedding and dispersing the seeds of plants, which is variously effected. Some are heavy enough to fall directly to the ground; others are furnished with a pappus, or down, by means of which they are dispersed by the wind; while others are contained in elastic capsules, which, bursting open with considerable force, throw out the seeds.

SEMI-PELA'GIANS, a sect of Christians, who differ from the Pelagians by holding that grace, necessary for the practice of virtue, may be obtained by an effort of the human will.

SEMI-QUAR'TILE, or **SEMI-QUAD'RATE**, in Astrology, an aspect of the planets, when distant from each other the half of a quadrant, or forty-five degrees.

SEM'IQUAVER, in Music, a note of half the duration of the quaver; being the sixteenth of the semibreve.

SEMI-SEX'TILE, in Astrology, an aspect of the planets when they are distant from each other the twelfth part of a circle, or thirty degrees.

SEMI'TIC, a term derived from Shem, the son of Noah, applied to a group of languages including the Chaldee, Syriac, Arabic, Hebrew, Samaritan, Phœnician, and Ethiopic.

SEM'ITONE, in Music, half a tone, being the smallest interval admitted in modern music. The *semitonic scale* consists of twelve degrees, or thirteen notes in the octave.

SEM'I-VOWEL, in Grammar, a half vowel, or consonant which, resembling a vowel, can be in some degree pronounced without the aid of another letter. The semivowels are *b*, *d*, *c*, *g*, *k*, *p*, *s*, *t*, *v*, *x*, and *z*.

SEN'ATE (*senatus*, from *senex*, an old man: *Lat.*), an assembly or council of senators: that is, a body of the principal inhabitants of a state, invested with a share in the government. The senate of ancient Rome was, of all others, the most celebrated; it appointed judges, either from among the senators or knights, to determine processes; it also appointed governors of provinces, and disposed of the revenues of the commonwealth, &c. Yet the whole sovereign power did not reside in it, since it could not elect magistrates; it did not, ordinarily, make laws, or decide on war and peace; in all which cases it was obliged to consult the people. The senate originally consisted only of patricians; its number, it is said, was at first 100, but was doubled on the addition of the Sabines, then increased to 300 by Tarquinius Priscus, on the incorporation of the Luceres. The older were distinguished from the last created, by their names: the former being termed *patres majorum gentium* (fathers of the greater houses); and the latter *patres minorum gentium* (fathers of the lesser houses). The senate was subsequently increased to 500 or 600; and ultimately, by the Emperors, to on one occasion, at least, 1000. The members were first chosen by the kings; afterwards by the consuls, military tribunes, and finally the censors; but certain offices gave a right to the privilege of belonging to the senate. At first the senate had supreme power; but this was lost when the right of *intercession*, or negativing their proceedings, was given to the tribunes of the people. Under the Commonwealth, however, it remained always very great. The senate subsisted till the occupation of Italy by the Goths. The provincial towns had senates, in imitation of that at Rome. —— In the United States of America, *senate* denotes the higher branch or house of legislature, viz. the upper house of congress; and in most of the states, also, the higher and least numerous branch of the legislature is called the senate.—— **SENATE-HOUSE**, a building in which the senate meets, or a place of public council.—— **SENATE**, in the university of Cambridge, is equivalent to the convocation at Oxford; it consists of all masters of arts, and higher graduates, being masters of arts, who have each a voice in every public measure, in granting degrees, in electing members of parliament, a chancellor, &c.

SENA'TUS AUCTOR'ITAS, a vote of the Roman senate, drawn up in the same form as a decree, but without its force; as having been prevented from passing into a decree by some of the tribunes of the people.

SENA'TUS CONSUL'TUM, a decree of the Roman senate pronounced on some question or point of law; which, when passed, made a part of the law.

SEN'EGA ROOT, the root of the *Polygala senega*, a North American plant. This root is woody, branching, and about half an inch in diameter. Its medicinal virtues, as a cure for the bite of a rattlesnake, have been greatly exaggerated, and also its efficacy as a remedy in pulmonary complaints. The plant grows to the height of about a foot, producing several herbaceous stems, and its blossoms resemble those of the pea.

SEN'ESCHAL (*Fr.*), in France, an office and dignity, derived from the middle ages, and answering to our *steward* and *high steward*. Originally seneschals were the lieutenants of the dukes, and were sometimes termed *Baillis*, or Bailiffs. When the dukedoms reverted to the French crown they were continued as judges and superintendents, but gradually lost their power, by encroachment of the sovereign. In Ireland the term is still employed to designate the stewards of baronies.

SEN'NA, the leaves of the *Cassia senna*, a leguminous shrub, which are imported here from Alexandria for medicinal use. They have rather a disagreeable smell, and a sub-acrid, bitterish, nauseous taste. They are in common use as a purgative, and are given as an infusion, tincture, or made into an electuary. Senna is often adulterated with the leaves of the *Cynanchum olei folium* or *Arghel*, from which, however, it may be known by being ribbed.

SENOC'ULAR (*seni*, six each; and *occulus*, an eye: *Lat.*), in Entomology, an epithet for such insects as have six eyes.

SENSE (*sensus*, from *sentio*, I feel: *Lat.*). The external organs of sense are usually classed under five heads, viz. those of sight, hearing, feeling, smell, and taste. The nerves and the brain are the organs of *sensation*. If the external organ be destroyed, no sensation can be produced; where there are no nerves there is no sensation; where the nervous branches are most numerous there is most sensation; if the nerve be destroyed, sensations cannot be produced from those parts to which the nerve belongs, which are further from the brain than the injured parts. The nerves of sensation terminate in the brain. If the brain is compressed, sensation is suspended; if the brain is considerably injured, sensation ceases. The accuracy and extent of the perception depends on the vividness and efficaciousness of the compound sensations and the number of them received from the same or similar objects in different situations, and through the medium of different senses. The object, therefore, of early education should be to invigorate the organs of sense.—— **COMMON SENSE**, is that power of the mind which, by a kind of instinct, or a short process of reasoning, perceives truth, the relation of things, cause and effect, &c., and hence enables the possessor to discern what is right and expedient, and adopt the best means to accomplish his purpose.——**Moral sense**, that mental faculty which has the power of distinguishing between right and wrong.

SENSIBIL'ITY (*sensibilis*, perceptible by the senses: *Gr.*), acuteness of perception, or that quality of the mind which renders it susceptible of impressions; delicacy of feeling; as *sensibility* to pleasure or pain, shame or praise.——In Physiology, the capability which a nerve possesses of conveying the sensation produced by the contact of another body with it.

SEN'SITIVE PLANT, a native of tropical America, but often seen in our greenhouses. It shrinks and folds up its leaves on the slightest touch. [See **Mimosa.**]

SENSO'RIUM, or SEN'SORY (*sensus*, the faculty of feeling: *Lat.*), the brain and nerves, the seat of sense. According to some writers, it not only denotes the different organs of sense, but also that living principle or spirit of animation which resides throughout the body, without being cognizable to our senses, except by its effects.

SEN'TENCE (*sententia*; from *sentio*, I perceive: *Lat.*), in Grammar, a number of words containing complete sense, and followed by a full pause; a period. A *simple* sentence consists of one subject and one finite verb; as, 'the man walks.' A *compound* sentence contains two or more subjects and finite verbs.——In Law, a judicial decision publicly and officially declared in a criminal prosecution. In civil cases, the decision of a court is called a judgment.

SEN'TIMENT (*Fr.*; from *sentio*, I feel: *Lat.*), in its primary sense, signifies a thought prompted by passion or feeling. Also, the decision of the mind, formed by deliberation or reasoning.——**Sentiments**, in Poetry, and especially the dramatic, are the thoughts which the several persons express; whether they relate to matters of opinion, passion, &c.

SEN'TINEL (*sentinelle*: *Fr.*; from *sentio*, I observe: *Lat.*), or SEN'TRY (*sentire*, to perceive: *Ital.*), in Military affairs, a private soldier placed in some post, to watch any approach of the enemy, to prevent surprises, and to stop such as would pass without order, or have no business where he is posted.

SE'PIA (*Lat.*; from *sēpia*: *Gr.*), in Zoology, a genus of Cephalopoda, to which the true cuttle fishes belong. Their internal shells form what is called cuttle bone. There is a very curious play of colours on the skin of the living animal, which may be seen after it is taken out of the water. The *sepiæ* possess a bag in which they secrete a thick fluid of an intense dark brown colour. This they eject on being alarmed, and thus make their escape whilst the water around them is discoloured. The pigment called sepia is prepared from cuttle fish ink. This matter has been found fossilized, and thus an animal that died a countless number of years ago might be painted with its own ink.

SE'POYS (a corruption of the Indian word *Sipahi*, a soldier), the name given to the native troops in India, of whom there were formerly nearly 200,000, chiefly infantry but including several regiments of cavalry and some companies of artillery. They were all disciplined after the European manner; and were considered, in some circumstances, as being good soldiers; but the great Indian mutiny has greatly diminished confidence in native troops. Their dress consisted of a red jacket, with a white cotton vest, trowsers reaching only half-way down the thighs, and a light turban.

SEPT (*septum*, an enclosure: *Lat.*), in Irish history, a clan, race, or family, proceeding from a common progenitor.

SEPTA'RIA (same *deriv.*), in Mineralogy, a name given to nodules or spheroidal masses of calcareous marl, whose interior presents numerous fissures or seams of some crystallized substance, which divide the mass. When calcined and reduced to powder, they furnish *roman cement*.

SEPTEM'BER (*Lat.*; from *septem*, seven), the seventh month of the ancient Roman year.

SEPTEMBRISA'DE, in Politics, a term in use during the revolutionary commotions in France for any horrid massacre like that which disgraced the 2nd and 3rd of September, 1792, and in which the state prisoners were murdered.

SEPTEN'NIAL (*septennium*, a period of seven years: *Lat.*), happening or returning every seven years, as *septennial* parliaments.

SEPTEN'TRIONAL (*septentrio*, a constellation near the north pole, consisting of seven stars: from *septem*, seven, and *trio*, a ploughing ox: *Lat.*), pertaining to the north, or northern regions of the globe.

SEP'TIC (*sēptikos*, putrefying: *Gr.*), in Chemistry, an epithet for any substance that promotes the putrefaction of bodies; as *antiseptic* is for whatever tends to preserve them from putrefaction.

SEPTUAGES'IMA (*septuagesimus*, the seventieth: *Lat.*), in the calendar, the third Sunday before Lent, about seventy days before Easter.

SEP'TUAGINT (*septuaginta*, seventy: *Lat.*), a Greek version of the books of the Old Testament; so called because the translation is supposed to have been made by seventy-two Jews, who, for the sake of round numbers, are usually called the *seventy interpreters*. It is said to have been made at the request of Ptolemy Philadelphus, king of Egypt, about 280 years before the birth of Christ. It is that out of which all the citations in the New Testament from the Old are taken. It was also the ordinary and canonical translation made use of by the Christian church in the earliest ages; and is still retained in the churches both of the east and west. According to the chronology of the Septuagint there were fifteen hundred years more from the creation to Abraham, than according to the present Hebrew copies of the Bible.

SEP'TUM (a partition: *Lat.*), in Anatomy, &c., a plate or wall which separates two adjoining cavities. Thus the *septum auris* or drum of the ear.——**Septum cerebelli**, a process of the *dura mater*, dividing the cerebellum into two equal parts.——**Septum**

CORDIS, the partition between the two ventricles of the heart.——SEPTUM NARIUM, the partition between the nostrils.

SEP'ULCHRE (*sepulcrum*, from *sepelio*, I inter: *Lat.*), a place destined for the interment of the dead. This term is chiefly used in speaking of the burying places of the ancients, those of the moderns being usually called *tombs*. Sepulchres were held sacred and inviolable, and the care taken of them has always been held a religious duty. Those who have searched or violated them have been thought odious by all nations, and were always severely punished. The Egyptians called sepulchres *eternal houses*, in contradistinction to their ordinary houses or palaces, which they called inns, on account of their short stay or pilgrimage on earth. The sepulchres of the Hebrews were sometimes hollow places dug out of rocks Thus Abraham is said to have buried Sarah his wife in the cave of Machpelah (Gen. xxiii. 19). In such sepulchres, also, the bodies of Lazarus and Jesus Christ were buried (John xi. 38, Matthew xxvii. 60). And the same custom prevails in the East to this day, according to the account of modern travellers.——KNIGHTS OF THE HOLY SEPULCHRE, a military order, instituted in Palestine about the year 1114. It was afterwards established in France by Louis VII., was united to that of Malta by Innocent VIII., and was taken under the protection of Louis XVIII. in 1814.

SEPULTU'RA (a burial; from *sepulto*, I keep buried: *Lat.*), in Archæology, an offering made to the priest for the burial of a dead body.

SE'QUENCE (*sequeno*, following: *Lat.*), in Music, a regular succession of similar sounds.——In Gaming, a set of cards immediately following each other, in the same suit, as a king, queen, knave, &c.; thus we say, a sequence of three, four, or five cards.

SEQUESTRA'TION (*sequestratio*; from *sequestro*, I give up for safe keeping: *Lat.*), in Chancery, a prerogative process, addressed to certain commissioners, empowering them to enter upon the defendant's real estates, and sequester the rents thereof, and also his goods and chattels, and personal estate, until he clears himself of his contempt. Also, a species of execution for debt, in the case of a beneficed clergyman, issued by the bishop of the diocese, on receipt of a writ for the purpose; the profits of the benefice are paid over to the creditors until his claim is settled.

SE'QUIN, or ZE'CHIN (*zecchino*, from *zecca*, a mint: *Ital.*), a gold coin of Venice and Turkey, of different values in different places; but generally about 9s.

SERAG'LIO (*Ital.*; corrupted from *Serai*, an oriental word), the palace of the Turkish sultan in Constantinople. Its principal gate is that of Babi Humayun, or *Sublime Gate*; whence is derived the title *Sublime Porte*, to signify the Sultan's ministry. In this building are also kept the females of the harem. [See HAREM.]

SERA'I, a large building for the accommodation of travellers, common in the East. In Turkey they are called *khans*; in Persia, *caravanserais*, which we write *caravansaries*; but in Tartary and India, simply *serais*.

SER'APH (to purify: *Heb.*), a spirit of the highest rank in the hierarchy of angels; thus called from their being supposed to be most inflamed with divine love, or holy zeal, owing to their more immediate attendance at the throne of God. The Hebrew plural is *seraphim*. They are almost always spoken of in connection with the *cherubim*, whom they resemble in rank and attributes.

SER'APHINE, a musical wind instrument: a kind of chamber organ.

SERAS'KIER (head of an army: *Pers.*), a Turkish general or commander of land forces.

SERENA'DE (*serenata*: *Span*; from *serenus*, clear: *Lat.*), music performed in the open air during the silence of night. It is generally instrumental, but the voice is sometimes added. Hence, an entertainment of music given in the night by a lover to his mistress under her window is styled a *serenade*.

SERF (*servus*: *Lat.*), a servant or, as is the case in some countries, a peasant slave, attached to the soil and transferred with it.

SERGE (*Fr.*), a kind of woollen quilted stuff.

SER'GEANT, or SER'JEANT (*sergent*: *Fr.*; from *serviens*, serving; *Lat.*), in Military affairs, a non-commissioned officer in a company of infantry or troop of cavalry, whose duty is to order and form the ranks, and see discipline preserved.——SERGEANT-MAJOR, a non-commissioned officer, who assists the Adjutant; he was formerly a field officer, of the same rank as *Major*.——COLOUR SERGEANTS, non-commissioned officers, appointed to attend those who have charge of the colours.——SERGEANT-AT-ARMS, officers whose duty is to attend the person of the King, and the Lord High Steward, when sitting in judgment on a traitor, &c. They are appointed by letters patent for life, and their number at present is eight; two of them, by royal permission, attend the houses of parliament during its sittings, and have large emoluments—particularly the one connected with the Commons. The one who attends in the court of Chancery is usually the Sergeant-at-arms of the House of Lords.——SERGEANTS-AT-LAW; these are gentlemen who have been advanced by the Lord Chancellor to this dignity, the highest at the bar, after ten years' standing. As the obtainment of the rank is attended with considerable cost, and as the sergeants have no longer exclusive audience in the court of Common Pleas, the dignity is not so much sought for as formerly. By way of distinguishing mark their wigs have a black patch on the crown, and in court they are always addressed as 'brother' by the Judges, as the occupants of the bench are invariably made sergeants if not previously of this dignity. On the appointment of a sergeant it is an ancient custom for him to distribute gold rings, bearing an appropriate motto, to the Sovereign, the Lord Chancellor, and the Judges. The Sergeants have an Inn to themselves.——COMMON-SERGEANT, an officer of the city of London, who attends the lord-mayor and court of aldermen on court-days; and is in council with them on all occasions.——KING'S SERGEANT, one or more of the Sergeants-at-Law, who are supposed to plead for the King, in causes of a public nature.——SERGEANTRY, in the old English law, is of two kinds. *Grand sergeantry* is a kind of knight service, by which the tenant was bound to do some special honorary service to the king in person; as to carry his banner or sword, or be his champion at his coronation, &c. *Petit sergeantry* was a tenure by which the tenant was bound to render to the king annually some small implement of war, as a bow, a sword, a lance, &c.

SE'RIES (*Lat.*; from *sero*, I plant), a continued succession of things in the same order——SERIES, in Mathematics, a number of terms, whether arithmetical or otherwise, increasing or decreasing according to a certain law.——SERIES, in Natural History, an order or subdivision of some class of natural bodies; comprehending all such as are distinguished from others of that class by certain characters, which they possess in common, and which the rest of the bodies of that class have not.——INFINITE SERIES, a series consisting of an infinite number of terms, at the end of which it is impossible ever to arrive; so that let the series be carried on to any assignable length, or number of terms, it can be carried still farther.

SERPENTA'RIUS (*serpens*, a serpent: *Lat.*), in Astronomy, a constellation in the northern hemisphere represented by the figure of a man grasping a serpent.

SER'PENTS (*Lat.*; from *serpo*, I crawl: *Lat.*), in Zoology, an order of reptiles which has been divided into two suborders:—1. *Viperina*, RATTLESNAKES and VIPERS, or those serpents which are poisonous. 2. *Colubrina*, BOAS, PYTHONS, and water snakes which are not poisonous. Serpents are vertebrate animals which are destitute of limbs, except occasionally in a very rudimentary form [see PYTHON]. The general form of their elongated tapering scaly bodies without a distinct neck is well known. The jaws are not articulated together, but are capable of being separated from each other when any large object is being swallowed. They advance along the ground by a sinuous motion, but when about to attack their prey, they usually erect their heads, and spring forward, the hinder part of the body serving as a fulcrum. The upper jaws of the poisonous serpents have moveable fangs, which are grooved on the outer edge, and along this groove the poison flows from a gland situate under the eye into the wound inflicted by the teeth. When not in use the fangs lie in a fold of the gums. Some serpents are oviparous, and of these some deposit their eggs in a sort of chain, leaving them to be hatched in a warm situation, whilst others, like the pythons, incubate their eggs. On the other hand, some serpents are viviparous, their eggs being hatched inside their bodies. The fascination which it has been often stated serpents exercise over other animals is perhaps nothing more than a stupefaction, the result of terror which their appearance excites.

SER'PENTINE, or **SER'PENTINE STONE**, in Mineralogy, a magnesian rock, of various colours, but usually greenish, sometimes speckled like the back of a serpent. Common serpentine will stand heat and is therefore sometimes made into cooking pots. When it veins limestone, it forms *verde antique*. Precious serpentine is translucent of a rich green colour.——*Serpentine verses*, in Poetry, verses which begin and end with the same words.

SERPI'GO (*serpo*, I creep: *Lat.*), in Medicine, a species of herpes; called in popular language, a *ringworm*.

SER'PULA (a little serpent: *Lat.*), a genus of marine worms, inhabiting twisted calcareous tubes, which are generally attached to shells or other objects. The animal has its aerating organs in the shape of threads arranged in two fans on the head, and it closes the mouth of its tube with a plug.

SER'PULITE (*serpula*, and *lithos*, a stone: *Gr.*), petrified shells or fossil remains of the genus *Serpula*.

SER'RATE, or **SER'RATED** (*serratus*; from *serra*, a saw: *Lat.*), in general, something notched or indented on the edge, like a saw.——In Botany, a leaf is said to be *doubly serrate* when the edges of the large serratures are again serrated with lesser indentings of the same kind.——A *serrate-ciliate* leaf is one having fine hairs, like the eye lashes, on the serratures. A *serrulate leaf* is one finely serrate, with very small notches or teeth.

SERRA'TULA (*Lat.*; from *serratus*, indented like a saw), in Botany, a genus of composite plants. The British species, *Serratula tinctoria*, is called saw-wort.

SERRICOR'NIA (*serra*, a saw; and *corun*, a horn: *Lat.*), a family of coleopterous insects, comprehending those which have serrated antennæ, a simple external lobe to the maxillæ, five jointed tarsi, and ample elytra.

SE'RUM (*Lat.*), that part of the blood in which the red globules are suspended. It consists of albumen, fibrin, and water. It coagulates at a temperature of from 150° to 170°.——Also *whey*, or the remainder of the milk after its richer parts have been taken away.

SER'VAL, the *Felis serval* of Zoologists, an animal resembling the lynx in form and size, and the panther in its spots. It is a native of India and Thibet.

SER'VICE (*servitium*; from *servus*, a servant: *Lat.*), in a general sense, labour, whether of body or mind, or of both united, performed in pursuance of duty, or at the command of a superior.——The duty which a tenant owes to his lord for his fee is called *personal service*.——The word *service* is also applied to the duty of naval or military men when serving their country; as *home service, foreign service, limited service*, &c.

SER'VICE-TREE (a corruption of *sorbus*: *Lat.*), the *Pyrus sorbus* of botanists.

nat. ord. *Pomaceæ*. The fruit of this tree is a powerful astringent, and therefore often used in cases of dysentery.

SER'VITOR (*Lat.*), an undergraduate at Oxford partly supported by college funds. Servitors are the same class as the sizers at Cambridge; they formerly attended on other students, whence their name.

SESAMOI'DEA OS'SA, or **SESAMOID BONES** (*sesamon*, a kind of seed, and *eidos*, form: *Gr.*), in Anatomy, little bones found at the articulations of the toes, so called from their supposed resemblance to the seeds of the sesamum.

SE'SAMUM (*Lat.; from sesamê: Gr.*), a genus of plants of the natural order *Pedaliaceæ*, supposed to have been originally natives of India, but now cultivated in many other countries. Their seeds are used as food; and yield a fine oil, constituting an extensive article of commerce in the East. The word *sesame* is well known to readers of the 'Arabian Nights' Entertainments.'

SESQUI (once and a half: *Lat.*), a term being commonly used in compound scientific terms, and signifying that a something is taken one and a half times.——In Geometry, the expression of a ratio, in which the greater term contains the less once, leaving a certain aliquot part of the less over; when the part remaining is half the less term, the ratio is called *sesquialtera;* when a third, *sesquitertia;* and so on. The word *sesquiduplicate* is used when, in a ratio, the greater term is twice and a half times the less.

SESQUIAL'TERAL (*sesquialter*, one and a half: *Lat.*), in Botany, a term applied to a large fertile floret, accompanied by a small abortive one.

SES'QUITONE, in Music, a minor third, or interval of three semitones.

SES'SILE (*sessilis*, sitting: *Lat.*), in Botany, an epithet for a leaf or a flower which issues directly from the stem or branch, without a stalk.

SES'SION (*sessio: Lat.*), in Law, a sitting of justices in court upon their commission, as the session of *oyer and terminer*, &c.——The session of a judicial court is called a *term:* a court may have two sessions annually. The term *sessions*, or *quarter sessions*, is applied to those quarterly meetings of justices of the peace, when minor offences are tried, or business performed which requires the sanction of two or more of them.——*Session of parliament*, the season and space between its meeting and its prorogation.

SES'TERCE (*sestertius*, contracted from *semis tertius*, the third minus a half, that is two asses and a half: *Lat.*), in Antiquity, a Roman coin, the fourth part of a denarius, and worth about twopence. It was of the value of two asses and a half; and hence was represented by L.L.S. (*libra, libra, semis*, a pound, a pound, and a half pound), or by the abbreviation H.S.——The sestertium, a contraction for *mille sestertionis*, contained one thousand sesterces; and a numeral adjective joined with it signified so many thousand sestertia: thus *decem sestertia*, ten sestertia, or ten thousand sesterces. A numeral adverb joined to it, or standing by itself, indicated so many hundred thousand: thus *decies* sestertia, or *decies*, ten hundred thousand sesterces. The sestertium in the time of Augustus was 8*l.* 17*s.* 1*d.*; and, after that, 7*l.* 16*s.* 8*d.*; and it may always be roughly estimated at 8*l.* One qualification of a Roman knight was the possession of estate of the value of four hundred thousand sesterces; that of a senator was double this sum.

SETA'CEOUS (*seta*, a bristle: *Lat.*), in Natural History, bristle-shaped; being in size and length like a bristle.

SET'-OFF, is a term used in law when the defendant acknowledges the plaintiff's demand, but makes a demand of his own, to *set-off* or counterbalance the debt either wholly or in part.——*Set-off*, in Architecture, a horizontal projection left in a wall, where the thickness diminishes.

SE'TON (*seta*, a bristle: *Lat.*), in Surgery, a sort of issue, generally in the neck; formed by means of horsehair or fine threads drawn through the skin by a large needle, by which a small opening is made and continued for the discharge of humours.

SETO'SE (*setosus*, covered with bristles: *Lat.*), in Botany, an epithet for a leaf or receptacle, the surface of which is set with bristles.

SETTEE, in the marine, a vessel of from 60 to 100 tons burden, with, generally, two masts, equipped with triangular or lateen sails. Settees are used in the Mediterranean for transporting cannon, stores, &c.——A kind of couch or sofa.

SETTLEMENT (*setol*, to settle: *Sax.*), in Law, the right acquired by an individual to parochial assistance. It is obtained by birth; bastard children follow the settlement of their mothers, until they are sixteen; legitimate children follow the settlement of their father, and after his death of their mother, until they become twenty-one years of age, or are married. A woman acquires the settlement of her husband, and, after his death, retains his last settlement, until she acquires a new one. A person bound apprentice, and inhabiting, under such apprenticeship, any town or parish during the last forty days, acquires a settlement in that town or parish. A person actually occupying and actually paying a rent of 10*l.* for at least one year, and dwelling forty days in the parish in which such tenement is situated, acquires a settlement in it, provided he has been rated to and paid the poor's rate for at least one year. A person, having an estate in lands or tenements, and having resided in the parish in which such an estate is situate for at least forty days, acquires a settlement; but no settlement is acquired by the purchase of property for which 30*l.*, at least, has not been really paid, and such right of settlement is retained no longer than the person resides within ten miles of the parish. The payment of parish taxes and levies, such as poor-rate, church-rate, or land-tax, with respect to a tenement worth 10*l.* per annum, gives a settlement. Poor people becoming chargeable to a parish in which they have no settlement may, by an order of two jus tices, be removed to that in which they have a settlement. A *certificate* is a written acknowledgment, by the churchwardens and overseers, that a particular person is legally settled in their parish.

SEXAGES'IMA (*sexagesimus*, the sixtieth: *Lat.*), the second Sunday before Lent, or the next to Shrove Sunday; so called, as being about the 60th day before Easter.

SEXAGES'IMAL ARITH'METIC (same *deriv.*), a mode of computing by sixtieths; such as the division of a degree into sixty minutes, and a minute into sixty seconds, &c.

SEXDE'CIMAL (*sex*, six; and *decem*, ten: *Lat.*), in Crystallography, an epithet used when a prism or the middle part of a crystal has six faces with two summits; and, taken together, ten faces.

SEXDUODECIMAL (*sex*, six; and *duodecim*, twelve: *Lat.*), in Crystallography, an epithet for a crystal when the prism has six faces with two summits; and, taken together, twelve faces.

SEX'TAIN (*sextaneus*, containing six: *Lat.*), in Poetry, a stanza containing six lines.

SEX'TANT (*sextans*, the sixth part: *Lat.*), in Mathematics, the sixth part of a circle, or an arc comprehending sixty degrees. Also, an astronomical instrument like a quadrant, except that it measures no more than sixty degrees. [See QUADRANT.]

SEX'TERY-LANDS, in Law, lands given to a church or religious house for the maintenance of the sexton or sacristan.

SEX'TILE (*sextilis*, pertaining to the sixth: *Lat.*), in Astrology, the position or aspect of two planets when distant from each other sixty degrees, or two signs—the sixth part of the ecliptic.

SEX'TILIS (*Lat.*), the sixth month of the early Roman year, but the eighth of a later period. It was under the protection of *Ceres;* and was afterwards called *August*, in honour of Augustus.

SEX'TON (corrupted from sacristan), an under officer of the church, whose business it is to take care of the vessels, vestments, &c., to attend the officiating clergyman, and perform other duties pertaining to the church. He was anciently called the *sacristan*—as he is still, in the Roman Catholic Church.

SFORZA'TO, in Music, an Italian term signifying that the note over which it is placed must be struck with force.

SHAB'RACK, a Military term, of Hungarian origin, used for the cloth furniture of a cavalry officer's troop-horse or charger.

SHAD'DOCK, the fruit of an Indian tree, the *Citrus Decumana*, nat. ord. *Aurantiaceæ*, and therefore allied to the orange and lemon trees. This fruit has a white, thick, spongy rind, and a red or white pulp; of a sweet taste mingled with acidity.

SHAD'OW, in Optics, a privation or diminution of light, by the interposition of an opaque body. *Shadow* differs from *shade*, as the latter implies no particular form, or definite limit; whereas a shadow represents in form the object which intercepts the light; as, the *shadow* of a man, of a tower, &c.——*Shading*, or *shadowing*, in Painting, the art of duly representing light and shade in a picture.——*To shadow*, to represent faintly, imperfectly, or typically.

SHAFT, in Architecture, the body of a column, between the base and the capital.——In Machinery, a strong bar, usually of a cylindrical form, employed to convey motion from the prime mover to the work.——In Mining, a pit, or long narrow vertical opening into a mine.

SHAGREE'N, in Commerce, a kind of grained leather, supposed formerly to be prepared from the skin of a species of shark. It is, however, now known that the material is the strong skin, cut along the chine, from the neck to the tail, of the ass or horse. The skin is first cut and scraped till it becomes scarcely thicker than a bladder. It is then, while wet and soft, fastened to a frame, the flesh side uppermost; and the upper or grain side is strewed over with the hard round seeds of a species of chenopodium; a felt is then laid over it, and the seeds are trodden deeply into the soft yielding skin. The frames are next placed in the shade till the skin becomes dry, and the seeds will shake out of their holes. After this the skin is rasped till the sides of the holes are worn down almost to a level with their bottoms; it is then soaked, first in water, and afterwards in an alkaline ley; and, as it becomes soft, those parts of the skin which were merely depressed by the seeds being forced down upon them, rise above the parts which had been rasped, presenting a granular or pustular surface. The skin is then stained superficially of a green colour by copper filings and sal ammoniac, and is afterwards allowed to dry; lastly, the grains or protuberances are rubbed down to a level with the rest of the surface, which thus presents the appearance of white dots on a green ground. Astracan is the seat of this manufacture, and vast quantities were imported into this country when it was the fashion to use it for watch and spectacle-cases, and a variety of other purposes.

SHAH (prince: *Pers.*), a name given by Europeans to the monarch of Persia, whose real title is *Padishah*, which see.

SHAKE (*sceacan*, to shake: *Sax.*), in Music, an embellishment, consisting of an alternate reiteration of two notes, comprehending an interval not greater than one whole tone, nor less than a semitone.

SHALE, in Geology, a species of schist, or slate clay, generally of a bluish or yellowish gray colour; but sometimes blackish or inclining to green. Its fracture is slaty, and in water it moulders into powder. It is often found in strata in coal mines, and commonly bears vegetable impressions.——*Bituminous shale* is a variety of argillaceous slate, which is impregnated with bitumen, and burns with flame.

SHAM'ANISM, a belief that certain individuals possess an influence over evil spirits entertained by some tribes of Finnish race in the old world, and by the Eskimos and some Indian tribes in the northern part of the new world. The individuals who claim such an influence are called *Shamans*, and they profess to have the sole power of communicating with the unseen world, of foreseeing deaths, and foretelling events. The evil spirits are propitiated through the shamans, and they are consulted if any untoward event occurs to one of the tribe. These sorcerers are consequently looked upon with respect and awe.

SHAM'MY (*chamois, Fr.*), a kind of leather prepared from the skin of the chamois, a species of antelope, inhabiting the mountains of Savoy, Piedmont, and the Pyrenees. It is dressed in oil or tanned; and much esteemed for its softness, pliancy, and the quality of bearing soap without injury A great part of the leather which bears this name is counterfeit, being made of the skin of the common goat, the kid, or even of sheep.

SHAM'ROCK (*scam rag: Irish*), the Irish name for a trifoliate plant, which some think is the trefoil, and others the wood-sorrel. According to legendary tradition, when St. Patrick landed near Wicklow, to convert the Irish, in 433, the Pagan inhabitants were about to stone him; but having obtained a hearing, he endeavoured to explain to them the Trinity in Unity; but they could not understand him, till, plucking a shamrock leaf from the ground, he said, 'Is it not as possible for the Father, Son, and Holy Ghost, as for these leaves, to grow upon a single stalk?' Upon which (says the legend) the Irish were immediately convinced.

SHARK, the name given to a tribe of voracious fishes which abound in all seas, several species having been taken on our coasts. They form the section *Squalidæ* of the order *Plagiostomi*, fishes with cartilaginous skeletons. Some of the species are small, others grow to a great size, and do not hesitate to attack man himself in the water. Such is the strength of the jaws and the sharpness of the teeth that the body of a man has been cut in two by a single bite. The most singular form is the Hammer-headed shark, which has a head like a hammer, with an eye at each end of the cross-piece.

SHARP'ING, in Archæology, a customary present of corn made about Christmas, by farmers in some parts of England, to the smiths; for sharpening their iron instruments of husbandry.

SHAS'TER, among the Hindoos, a sacred book containing the dogmas of the religion of the Bramins, and the ceremonies of their worship. It consists of three parts; the first containing the moral law of the Hindoos; the second the rites and ceremonies of their religion; the third the distribution of the people into tribes or classes, with the duties pertaining to each. [See SASTRA.]

SHAWL, (*châle: Fr.*), a garment used as a loose covering for the neck and shoulders. Shawls are made of various materials, as fine wool, silk, or wool and silk mixed, and of various sizes. They were originally manufactured in the heart of India, from the fine silky wool of the Thibet sheep; but the best shawls now come from Cashmere.——At Kilghiet, in the district of Soudah, twenty days' journey from Cashmere, is held the great mart for the worsted employed in the manufacture of the soft stuffs used as shawls. There are two qualities of worsted; that which is most readily dyed is white; the other species is of a light ash colour, which cannot, without some difficulty, be rendered sufficiently white, and is more frequently used of the natural colour. One goat rarely furnishes more than two or three pounds of worsted per year. When the shearing is finished, the two qualities are carefully separated; after which they undergo repeated washings in rice water. Great importance is attached to the operation of washing; and the Cashmerians attribute much of the delicacy of their unrivalled productions to the fine qualities of the waters of their valley. The form, size, and border of the shawls vary according to the different markets for which the manufacturer designs them.

SHAWM, in Antiquity, an instrument used in the sacred music of the Hebrews.

SHEATH'ING (*tchawme: Teut.*), in Naval Architecture, sheets of copper nailed all over the outside of a ship's bottom, to protect the planks from the pernicious effects of worms.

SHEAVE, in Mechanics, a solid wheel having a groove in its circumference, fixed in a channel, and movable about an axis. It is the wheel in which the rope works in a *block*, and is made either of wood or metal.——*Sheave-hole*, a channel cut in a mast, yard, or timber, in which to fix a sheave. [See BLOCK.]

SHEEP, a well-known animal, of which there are many varieties. They belong to the genus *Ovis* of zoologists, a member of the tribe of *Bovidæ*. In our island the breeding of sheep has received much attention, and the various breeds are well distinguished from one another. The points which are most looked to are the quality of the flesh for food, and the quality and abundance of the wool. Every part of the animal is of use. 'The dressed skin,' says Pennant 'forms different parts of our apparel, and is used for covers of books. The entrails, properly prepared and twisted, serve for strings for various musical instruments. The bones, calcined (like other bones in general), form materials for tests for the refiner. The milk is thicker than that of cows, and consequently yields a greater quantity of butter and cheese; and in some places is so rich, that it will not produce the cheese without a mixture of water to make it part from the whey. The dung is a remarkably rich manure. To conclude; whether we consider the advantages that result from this animal to individuals in particular, or to these kingdoms in general, we may, with Columella, consider this, in one sense, as the first of the domestic quadrupeds.'

SHEIK (*Arab.*), an elder or chief of the Arabic tribes or hordes. The Sheiks are very proud of their long line of noble ancestors; and some of them take the title of *Emir*. The Mohammedans also call the heads of their monasteries *sheiks*, and the

Mufti of Constantinople is called *sheik ulislam*, or chief of the true believers.

SHE'KEL (*Heb.*), a Jewish silver coin, worth about **2s. 7d.** The *Shekel of the Sanctuary* was used in calculating the offerings of the temple, and the sums connected with religion; the *royal*, or profane shekel, in secular matters; their relative values are not known.

SHEL'DRAKE, the *Tadorna vulpanser* of ornithologists, one of the most ornamental of our wild ducks.

SHELL (*scyll: Sax.*), in Gunnery, a hollow cast iron ball to throw out of mortars, &c., having a vent through which the powder is put that is to burst it; when it is filled, the fusee for setting fire to the powder is driven firmly into the hole. The fusee is a wooden tube filled with a composition consisting of sulphur, saltpetre, and mealed powder; and of such a length as to explode about the time that the shell reaches the ground. ——In ships, the *shell of a block* signifies the outer frame or case, in which the sheave or wheel is contained.——*To shell*, in the Veterinary art, is said of an aged horse that has the teeth completely bare and uncovered.

SHELLS, the protective envelopes of many mollusca. Three-fourths of these animals have univalve shells, the rest have chiefly bivalve shells, but some have shells of several pieces. Shells are usually external, but amongst the cephalopoda they are internal when present, and in some genera of other classes they are concealed by a mantle. They are composed of carbonate of lime with a little animal matter. The texture of shells has been expressed by the term porcellanous, which refers to the dull lustre some exhibit when broken, nacreous or pearly, fibrous, horny, and glassy. The peculiar play of light upon pearly shells arises from a minute undulating membrane which alternates with layers of carbonate of lime in their structure. In many shells there is a nacreous layer next the animal, and this furnishes the mother of pearl of commerce. The cellular structure of shells can only be made out in thin sections with the aid of the microscope. On the outside of a shell there is a membranous coat called epidermis, or *periostracum*, which is sometimes thin, sometimes thick, and extended into hairs. It is that part of the animal called the mantle, which is concerned in forming of the shell, which is being continually added to as the animal grows. Lines of growth may usually be perceived upon shells, and in some univalves the revolute mouth of the shell is not removed, but may be traced along the spire in the shape of ridges called *varices*. The forms of shells vary greatly, and being characteristic of families and genera are studied by conchologists. Their elegance, combined with beauty of colouring, has caused them to be sought for in all ages. The hardening principle of shell is generally carbonate of lime, almost pure; the animal principle, in porcellanous shells, a small quantity of soluble gelatine; in mother of pearl shells, albumen. Hence the latter, when steeped in dilute muriatic acid, leave a cartilaginous residue, while the former are entirely dissolved. The variety in the figure, colours, and other characters of sea shells, is almost infinite. The most beautiful come from the East Indies and the Red Sea. The sun, by the great heat that it gives to the countries near the line, heightens the colours of the shells produced there, and gives them a lustre and brilliancy which is wanting in those of colder climates. [See CONCHOLOGY, GEOLOGY, &c.]

SHEL'TIE, the appellation given to a small but strong horse in Scotland; so called from Shetland, where it is bred.

SHEPHERD KINGS: in Egyptian History these were kings styled Hyksos, who obtained possession of Egypt during the fifteenth, sixteenth, and seventeenth dynasties, driving the rightful sovereigns into Ethiopia. They came from the side of Syria about 2100 B.C., and were not expelled until after they had reigned 511 years. It is said that they then founded Jerusalem. According to tradition, they had red hair and blue eyes. There is much mystery about them, and various conjectures have been put forward, some supposing them to have been Scythians, others that they belonged to some Semitic nation, and were perhaps Jews.

SHER'BET (*sharbat: Arab.*), a drink composed of sugar, lemon juice, and water, sometimes with perfumed cakes dissolved in it, with an infusion of a small quantity of rose-water. Another kind is made with honey, the juice of raisins, violets, &c.

SHER'IFF (originally *shire reeve*, governor of the shire: *Sax.*), an officer in each county of England, annually nominated by the crown. He is invested with a judicial and ministerial power, and takes precedence of every nobleman in the county, during the time of his office. His judicial authority consists in hearing and determining causes in his county court (the judicial business of which, however, has been, for the most part, transferred to the *County Courts*), in superintending the election of knights for the shire, coroners, &c. He keeps the peace of the county, being by the common law the principal conservator of the peace there; for which reason he is to assist the justices, and raise the *posse comitatus* when occasion requires. As a minister, he is bound to execute all processes issuing from the king's courts of justice. In the commencement of civil causes he is to serve the writ, to arrest, and to take bail; when the cause comes to trial he must summon and return the jury; when it is determined he must see the judgment of the court carried into execution. In criminal matters, he also arrests and imprisons; he returns the jury; he has the custody of the accused; and he executes the judgment of the court. It is also his duty to preserve the rights of the crown; to seize all lands devolved thereto by attainder or escheat; to levy fines and forfeitures; to seize and keep all waives, wrecks, estrays, &c., if they fall immediately to the crown; and to collect the regal rents, if so commanded by process from the exchequer. To execute these various duties the sheriff has under him many inferior officers; an under-sheriff, who is always an attorney-at-law; bailiffs and gaolers; and the under-sheriff, in reality, transacts nearly the whole business here described. The duties performed by the sheriff himself are now merely of an honorary character; but he is responsible for the acts of those under him.

SHER'RY, a Spanish wine, made in the neighbourhood of Xeres de la Frontera, in the province of Andalusia, near Cadiz. Red and white grapes are used indiscriminately in its manufacture; that which we call dry sherry is the most esteemed. Sherry contains from 20 to 23 per cent. of alcohol; it is a wine much imitated and adulterated.

SHEW'-BREAD, in the Jewish rites, the loaves of unleavened bread which the priest placed on the golden table in the sanctuary. These loaves were twelve in number, representing the twelve tribes of Israel; and were to be eaten by the priest only.

SHIB'BOLETH (a flood: *Heb.*), a word which was made the criterion by which to distinguish the Ephraimites from the Gileadites, after the defeat of the former by Jephthah. The Ephraimites pronounced the word *sibboleth*. See Judges xii. Hence, when some characteristic or peculiarity of a party is observed, it is common to speak of it as the *shibboleth* or watch-word of that party.

SHIELDS, a broad piece of defensive armour, formerly borne on the left arm, as a defence against arrows, darts, lances, and other weapons. The shields of the ancients were of different shapes and sizes, and generally made of leather, or wood covered with leather. The surface, or as it is called in Heraldry, the *field*, of the shield, or escutcheon, appears to have been in all ages decorated with figures emblematical or historical, serving to express the sentiments, record the honours, or at least distinguish the person of the warrior.

SHIL'LING, an English silver coin, equal in value to twelve pence. The word is supposed, by some, to be derived from the Latin *sicilicus*, which signifies a quarter of an ounce or the 48th part of a Roman pound. In support of this etymology, it is alleged that the Saxon shilling was also the 48th part of the Saxon pound. At the time of the conquest, the shilling was worth fourpence. Afterwards the French *solidus* of twelvepence, which was in use among the Romans, was called by the name of *shilling*; and the Saxon shilling of fourpence took the Norman name of *groat* or *great coin*, because it was the largest English coin then known. It is supposed to have obtained its present relative value in the reign of Edward I. Many other countries have a coin of this name; the Hamburgh shilling is worth 1d. English.

SHIN'GLE (*schindel: Teut.*), in Architecture, a thin board used for covering sheds and other buildings.——SHINGLE, pebbles rounded by the sea on the beach.

SHIN'GLES (a corruption of *ceingle*, a belt: *Fr.*), in Medicine, an eruptive disease, which spreads round the body like a girdle. It is a troublesome, but not a contagious or dangerous disease; and probably arises from indigestion or suppressed perspiration.

SHIP, a general name for all large vessels which are built upon a peculiar principle, and adapted for the purposes of navigation; more particularly those equipped with three masts and a bowsprit, the masts being composed of a lower mast, top-mast, and top-gallant mast, each of which is provided with yards, sails, &c. They have gradually increased in bulk from the open galleys of the ancients of fifty or sixty tons to a ship of 5000 tons, and, as in the Great Eastern, to one of 20,000 tons. The *ballast* is placed on the bottom; it consists of iron pigs or stones, and is intended to steady the vessel when she is without cargo. Pieces of wood, called *dunnage*, rest on the ballast, and sustain the iron tanks on the casks containing the fresh water. The *hold*, in large ships, is divided into the fore, main, and after. The gunner's, boatswain's, and carpenter's store rooms, are in the *forehold* of a man-of-war; also, a powder magazine when there are two, water, wood for firing, coals, &c.; water, stores, chain cables, &c., are stowed in the *main hold*; provisions in the *after hold*, in which also is the *spirit room* and a *powder magazine*. In the shallow part behind is the *biscuit room*. The *sail room* is over the fore hold; the hemp cables are kept over the main hold; and also immediately over the holds are the *fore* and *after cockpits*: the whole of this deck being called in large ships, the *orlop deck*. The men mess and sleep on the *lower deck*, which is immediately above the orlop deck; in large ships, this is the *lower gun deck*. The largest ships carry three tiers of heavy cannon; the lowest being on the *middle deck*, the next on the *main deck*. The *upper deck* consists of the *forecastle* and the *quarter deck*, both furnished with guns. The deck over this, reaching from the after extremity to a little before the mizen mast, is called the *poop*; on the after part of these decks, from the mizen mast, are the cabins of the admiral, captain, and officers; that of the officers being called, in ships of the line, the *ward room*; and in frigates, the *gun room*. The length of a ship of the largest class is about 200 feet at the water line, her extreme breadth, 54 feet; her draught of water, about 26 feet; the height of her truck above water, 210 feet; her whole weight with crew, provisions, &c., 4600 tons, of which the hull weighs about one-half. But these dimensions are greatly exceeded by those of the Great Eastern. [See NAVIGATION.] The great power of rifled cannon, and the improvement of artillery, has introduced a new class of vessels, of great strength, having all, or nearly all, their exposed surface covered with plates of the very best iron 4½ inches in thickness, and supported interiorly by a great mass of the strongest wood.——SHIPPING, whatever relates to ships, including every sort of vessel employed upon the water, together with the laws, customs, and regulations connected therewith, &c.

SHIP'-BUILDING, the practical branch of naval architecture, or the art of constructing vessels for navigation, particularly ships and other vessels of a large kind, bearing masts; in distinction from *boat-building*. To give an idea of the enormous quantity of timber necessary to construct a ship of war, we may observe that 2,000 tons, or 3,000 loads, are computed to be required for a seventy-four. Now, reckoning fifty oaks to the acre, of 100 years' standing, and the quantity in each tree at a load and a half, it would require forty acres of oak-forest to build one seventy-four; and the quantity increases to an immense extent for the largest class of line-of-battle ships. A first-rate man-of-war requires about 60,000 cubic feet of timber, and uses 180,000 pounds of rough hemp, in the cordage and sails. The average duration of these vast machines, when employed, is computed to be fourteen years. Ship-building made but very slow progress until the introduction of the compass, when the application of astronomy to nautical purposes at once set the mariner free from the land. Thenceforward he was thrown upon the wide ocean, was brought into contact with unknown perils, to obviate which he was led to untried experiments. The art of navigation has since strode forward with giant steps. To the Italians, Catalans, and Portuguese, belong most of the advances in the earlier days of its revival; the Spaniards followed up the discovery of the new world with a rapid improvement in the form and size of their ships, some of which, taken by the cruisers of Elizabeth, carried 2000 tons. In modern times, to the British, French, and Americans, belong the credit of the progress which has been made in this important branch of art.

SHIP'-MONEY, in English history, an ancient impost upon the ports, towns, cities, boroughs, and counties of the realm, for providing ships for the king's service. This demand was revived by Charles I. in the year 1634; and, being laid by the king's writ under the great seal, without the consent of parliament, was held to be contrary to the laws and statutes of the realm, and subsequently abolished.——It was one of the chief causes which led to the great rebellion.

SHIP'S PAPERS, certain papers or documents, descriptive of the ship, its owners, the nature of the cargo, &c. They consist —1st, of the certificate of registry, licence, charter-party, bills of lading, bill of health, &c. which are required by the law of England; and, 2dly, those documents required by the law of nations to be on board neutral ships, to vindicate their title to that character.

SHIRE (*Scyr*; from *scyram*, to divide: *Sax.*). In English Topography, the same with *County*. Alfred is said to have made divisions which he called *Satrapias*; and which took the name of *Counties*, after *Earls*, *Comites*, or *Counts* were set over them. He also subdivided the Satrapias into *centurias* or *hundreds*; and these into *Decennas*, or *tenths* of *hundreds*, now called *Tithings*.

SHI'RE-MOTE, the ancient name in England for the county court.

SHIT'TIM-WOOD, in Scripture, a kind of precious wood of which the tables, altars, and boards of the tabernacle were made. It is said to be hard, smooth, and very beautiful.

SHIV'ER, in Mineralogy, a species of blue slate, schist, or shale.

SHI'VER-SPAR, in Mineralogy, a carbonate of lime; so named from its slaty structure; it is sometimes called *slate-spar*.

SHOAD-STONE, in Mineralogy the Cornish term for a small smooth stone, of a dark liver colour with a shade of purple. Shoad-stones are found in loose masses at the entrance of mines, sometimes running in a direct line from the surface to a vein of ore. They usually contain mundic, or marcasitic matter, and a portion of the ore of the mine.

SHOAL (*sceole*: *Sax.*), a shallow piece of water, or a shallow part of the sea near the coast, which often proves dangerous to navigation. Also, an immense multitude of fish, called *school* by the fishermen.

SHOE (*sceo*: *Sax.*), a covering for the foot, usually made of leather, the material for the sole being thick and hard, and that for the upper part soft. The finest sort of shoes is made in London; but the manufacture is carried on upon the largest scale in Northamptonshire and Staffordshire. In former times the people had an extravagant way of adorning their feet; they wore the beaks or points of their shoes so long that they encumbered them in walking, and were forced to tie them up to their knees; the fine gentlemen fastening theirs with chains of silver, or silver gilt, and others with laces. This ridiculous custom was in vogue from the year 1382, but was prohibited, under a penalty of 20s., and the pain of cursing by the clergy, in 1467.——The shoes of the Romans, like those of the Jews and Greeks, covered half of the leg, were open before, and tied with thongs called *corrigiæ*. Black shoes were worn by the citizens of ordinary rank, and white ones by the women. Red shoes were sometimes worn by the ladies, and purple by the coxcombs of the other sex. Red shoes were put on by the chief magistrates of Rome on days of ceremony and triumphs. The shoes of senators, patricians, and their children, had a crescent upon them which served for a buckle; these were called *calcei lunati*. Slaves wore no shoes; hence they were called *cretati* from their dusty feet.——The *shoe of an anchor* is a small block of wood, convex on the back, with a hole to receive the point of the anchor fluke. It is used to prevent the anchor from tearing the planks of the ship's bow, when raised or lowered.

SHOOT'ING STARS. [See FALLING STAR.]

SHORE, the coast or land adjacent to the sea or some large river; the sea-shore has been divided by some writers into three portions, the first of which is that tract of land which the sea just reaches in storms and high tides, but which it never covers; the second part of the shore is that which is covered in high tides, but is dry at other times; and the third is the descent from this.——**SHORE**, in Architecture, a piece of timber, placed to prop up a wall, &c.

SHORL, in Mineralogy, a substance usually of a black colour, found in masses of an indeterminate form, or in prisms of three or nine sides. The surface of the crystals is longitudinally streaked. The amorphous sort presents thin, straight, distinct columnar concretions, sometimes parallel, at other times diverging or stelliform. The mineralogists of the last century comprehended a great variety of substances under the name of *shorl*, which later observations have separated into several species, and which are now known as *actinolite, augite, leucite*, &c.

SHOR'LITE, a mineral of a yellowish green colour, found in irregular oblong masses or columns, inserted in a mixture of quartz and mica or granite.

SHOT, a general name for any missile discharged from cannon and firearms of all kinds. Shot used in war is of various kinds; as—1, *round-shot* or *balls*, those for cannon made of iron, those for muskets and pistols of lead; 2, *double-headed shot* or *bar shot*, consisting of a bar with a round head at each end; 3, *chain-shot*, being two balls fastened together by a chain; 4, *grape-shot*, consisting of a number of balls bound together with a cord in canvas on an iron bottom; 5, *case shot* or *canister shot*, by which is meant a great number of small bullets enclosed in a cylindrical tin box; 6, *langrel* or *langrage*, which consists of pieces of iron of any kind. Musket balls are called *small shot*; and those small globular masses of lead used by sportsmen in killing birds and other small game are known by the name of *shot*, of different numbers according to their size. In the manufacturing of this, the liquid metal is allowed to fall like rain from a great elevation into water, and the cohesive principle gives rotundity to the drops. In their descent they become truly globular, and before they reach the end of their fall are hardened by cooling. The truly spherical are separated from those which are imperfect, by causing all of them to roll down an inclined plane when those which are imperfect run off at the sides. The different sizes are separated by passing them through holes of various dimensions.——SHOT OF A CABLE, the splicing of two cables together, or the two cables thus united; thus, it is said, a ship will ride easier in deep water with one *shot of cable* thus lengthened than with three short cables.

SHOT'-RACKS, in a ship, wooden frames bolted to the crampings and head-ledges round the hatchways on the decks, to contain the different shot.——SHOT-LOCKER, a long piece of wood, pierced with holes like cups, in which shot are placed.

SHRAP'NEL SHELLS, in Gunnery, shells filled with musket balls which, when the shell explodes, are projected about 150 yards farther. They are fired from guns, mortars, &c.

SHREW, the *Sorex araneus* of Zoology, a small harmless animal resembling the mole in its long taper cartilaginous snout, and minute eyes, and in other parts the common mouse; it burrows in the ground, and feeds on corn, insects, &c.

SHRIKE, the *Butcher bird*, or *Lanius*, which see.

SHROUDS, a range of large ropes extending from the head of a mast to the right and left sides of a ship, to support the mast. There are *main shrouds, fore shrouds, mizen shrouds, bowsprit shrouds*, &c.

SHROVE-TU'ESDAY (*preterite* of *shrive*, to confess), the Tuesday after Quinquagesima Sunday, or the day immediately preceding the first of Lent; being so called from having been employed by the people in confessing their sins to the priest, and thereby, as was supposed, qualifying themselves for a more religious observance of the approaching fast.

SHRUB, a small woody plant between a herb and a tree.

SHUT'TLE, an instrument used by weavers for shooting the thread of the woof from one side of the cloth to the other, between the threads of the warp, in weaving.

SIAL'AGOGUE (*sialon*, saliva; and *agōgos*, a leading: *Gr.*), a medicine that promotes the salivary discharge.

SIB'ERITE, in Mineralogy, red tourmalin; the finest specimens of which have been found in Siberia.

SIB'YLS (*sibyllo*: *Lat.*), in Antiquity, certain women who pretended to be endowed with a prophetic spirit. They resided in various parts of Persia, Greece, and Italy, and were consulted on all important occasions. They delivered oracular answers, and, as it is pretended, wrote certain prophecies on leaves in verse, which are called *Sibylline verses*; but these Sibylline oracles seem to have been composed to answer political purposes. The number of *Sibyls*, according to Varro, was ten. The most celebrated were the Sibyl of Cuma, said to have been consulted by Æneas; and the Sibyl who offered her books to Tarquin the proud. The Romans kept these books with infinite care; and had recourse to them, on great occasions, with the utmost credulity.

SIDERA'TION (*sideratio*; from *sidus*, a constellation: *Lat.*), the blasting of trees with great heat and drought. It was supposed to be produced by the malign influence of the stars.

SIDE'REAL (*sidereus*, pertaining to the stars: *Lat.*), in Astronomy, pertaining to the stars. A *sidereal day* is the time in which any star appears to revolve from the meridian to the meridian again, which is 23 hours 56 minutes 4·09 seconds. The *sidereal year* is the time in which the earth performs a complete revolution, relatively to the fixed stars, in its orbit; which is 365·2563612 mean solar days, or 365 ds. 6 hrs. 9 min. 9·6 sec. It is 20 min. 19·9 sec. longer than the *Tropical year*.

SIDE'RITE (*siderites* of iron: *Gr.*), in Mineralogy, *sparry iron ore*, a native carbonate of iron.

SIDEROCAL'CITE (*sideros*, iron: *Gr.*; and *calx*, limestone: *Lat.*), in Mineralogy, brown spar.

SIDEROG'RAPHY (*sideros*, iron; and *grapho*, I write: *Gr.*), the art or practice of engraving on steel, by means of which impressions may be transferred from a steel plate to a steel cylinder, in a rolling-press constructed on a peculiar principle. Hence the term *siderographic* art, applied to steel plate engraving.

SIDE'ROSCOPE (*sidēros*, iron; and *skopeo*, I examine: *Gr.*), an instrument of French invention, for detecting small quantities of iron in any substance, mineral, animal, or vegetable. Its construction is founded on the supposition that the small quantity of magnetism they manifest is due to the presence of iron.

SIEGE (*Fr.*), in the art of War, the encampment of an army, before a fortified place, with a design to take it. A *siege* differs from a *blockade*, for in a siege the investing army approaches the fortified place, to attack and reduce it by force; but in a blockade the army secures all the avenues to the place, to intercept all supplies, and waits till famine reduces the besieged to surrender. The operations of a siege may be thus sketched. The engineers of the besieging party examine as well as they are able the different parts of the fortification to be attacked; they then make a plan of the work and the ground around it. The army, meanwhile, is employed in forming an encampment out of the range of the guns of the place, and in cutting timber and brushwood for the construction of the materials required for the siege, such as gun platforms, wood for lining galleries, &c., and especially GABIONS, SAP ROLLERS and FASCINES. Bags are filled with earth, to the number of many thousands. All being now ready, and the point of attack having been selected, a working party of men, each carrying a fascine, pickaxe, and shovel, and protected by an armed force, begin to dig with all speed a trench parallel to the fortification. This will probably have a length of 2000 yards, as planned by the engineers. With the earth taken out of the trench a bank is raised on the side next the enemy. This is the first parallel, and it is intended as a road along which men, guns, and munitions shall travel without being exposed to the fire, and out of the view of the enemy. Batteries are then erected on the side next the fortification. The besiegers will by this time have become aware what front of their work will be attacked. They therefore strengthen their defences, place a double line of palisades in the covered way [See FORTIFICATION], erect traverses to lessen the effect of the enfilade and ricochet fire of the besiegers, open fresh embrasures on the ramparts, drive mine galleries under the glacis, and so on. The attacking fire is of four kinds; direct, to batter down the walls of the place; enfilading, to rake along a line; ricochet, to send balls bounding down the faces of the ramparts, and damage the artillery; and vertical, from mortars, to destroy magazines, barracks, &c. within the enclosure. The firing having continued for some days, another trench is dug out of the first parallel towards the place, pursuing a zigzag direction, with the view of preventing the enemy obtaining any raking fire along the road thus formed. At a proper distance a second parallel is constructed, connected with the first by the zigzag road. New batteries are formed, from which a fresh fire is poured into and against the place. Another zigzag road is then made approaching still nearer to the fortification, and fresh lodgments, called demi-parallels, are effected at a distance of only 150 yards from the work to be reduced. In order to keep down the fire of riflemen, and to hinder the prosecution of repairs to the defences, stone mortars are placed in the wings of the demi-parallels, and these keep up a ceaseless discharge of balls, grenades, &c., upon the front, and this is replied to by small mortars, called royals and cohorns. Sapping is now employed to advance the approaches. The first workman, protected by a sap roller pushed in front, places a gabion between himself and the fortress. This he fills with earth from the trench as rapidly as he can. His comrades increase the size of the trench, and thus, when sandbags have been placed in the hollows between the gabions, a safe cover is obtained. A third parallel is in time formed at the foot of the glacis, and the besiegers endeavour to gain the covered way of the fortress, either by the slower process of sap and mine or by assault. If this should be won by the besiegers, breaching batteries are constructed and a hole made in the wall, the rubbish of which falls into the ditch and makes a slope for the assent of the assaulting party. The troops for this duty are brought up by a subterranean gallery leading from the trenches into the ditch. Should the garrison persist in defending the place, then mining is resorted to, whilst a system of countermining is adopted by the enemy. Supposing the besiegers to work their way onwards, globes of compression and surcharged mines are employed to blow up the enemy's works.——TO RAISE THE SIEGE, is to abandon the attack, and the works thrown up against a place.

SIER'RA, a term used for a hill, or chain of hills; particularly in Spain, the west coast of Africa, and the coasts of Chili and Peru.

SIGILLA'RIA (*Lat.*; from *sigilla*, a little image: *Lat.*), fossil plants, found in the coal formations.

SIGN (*signum*: *Lat.*), in a general sense, a visible token or representation of anything. Also, any motion, appearance, or event which indicates the existence or approach of something else.——SIGN, in Astronomy, the twelfth part of the ecliptic. On account of the precession of the equinoxes, the positions of the constellations in the heavens no longer correspond with the divisions of the ecliptic of the same name, but are now considerably in advance of them. [See ZODIAC.]

SIG'NA (*Lat.*), in Antiquity, standards or ensigns among the ancients; those of the Romans usually bore the figure of an eagle, but those of the Greeks the figures of various animals.

SIG'NALS (*Fr.*), certain signs agreed upon between parties at a distance; for the purpose of conveying instantaneous information, orders, &c. Signals are particularly useful in the navigation of fleets, and in naval engagements. They are made by the admiral or commander-in-chief of a squadron, either in the day, or by night, whether for sailing, fighting, or the better security of the merchant ships under their convoy. They are very numerous and important, being all appointed and determined by the lords of the admiralty, and communicated in the instructions sent to the commander of every ship of the fleet, or squadron before their putting to sea.——*Day-signals* are usually made by the sails, by flags and pendants, or guns; *night-signals*, by lanterns disposed in certain figures, rockets, or the firing of guns; *fog-signals*, by guns, drums, bells, &c. There are signals of evolution addressed to a whole fleet, to a division, or to a squadron; signals of movements to particular ships; and signals of service, general or particular. The signals used in the army are usually made by beat of drum, or the sound of the bugle.——SIGNALS, on Railways, the means used to give notice of the dangerous proximity of one train to another. By day they are generally a modified form of the old telegraph with moveable arms; by night, coloured lamps, explosive balls placed on the line, &c. But no perfectly satisfactory system has yet been devised.

SIG'NATURE (*Fr.;* from *signo*, I mark with a seal: *Lat.*), the name of a person written or subscribed by himself.——In MUSIC, the flats and sharps, placed after the clef, at the beginning of the staff; they affect all the notes of the same letter, in the movement.——In Printing, a letter put at the bottom of the first page at least, in each sheet, as a direction to the binder, in folding, gathering, and collating them.

SIGN-MAN'UAL, in English polity, the royal signature. In a general sense, it is the signature of any one's name in his own hand-writing.

SI'LEX, or **SIL'ICA** (*silex*, a flint: *Lat.*), substances in nature. It is a constituent in most rocks and stones, and common quartz, flint and agate, consist almost entirely of it. It may be obtained in a separate form by heating pure and colourless rock crystal to redness, and quenching it in water; it is then opaque and friable, and reduced to powder is nearly pure silica. It consists of one atom of silicon or silicium, and probably three atoms of oxygen; it forms salts with bases, and hence is often called silicic acid. It is found in either the soluble or insoluble form. Its specific gravity is about 2·6; it can only be fused by the oxyhydrogen blowpipe. If fused with three parts carbonate of potash it forms a soluble glass, the solution obtained from which was formerly called *liquor of flints*. [See WATER-GLASS.] But, if the proportions are reversed, that is, if three parts silex and one part carbonate of potash are used, the result will be insoluble or ordinary glass.

SIL'HOUETTE (*Fr.*), the representation of an object in a black colour, with the prominent features generally lightened, and the shadows indicated by being touched with gum.

SIL'ICATES, in Chemistry, compounds of silica, or silicic acid, with certain bases, as alumina, lime, magnesia, soda, &c., constituting the greater number by far of the hard minerals which encrust the globe.

SILI'CIUM, or **SIL'ICON**, in Chemistry, the undecomposed base of silica. It may be obtained by bringing potassium in contact with pure silex, heated to whiteness. It is dark coloured, without lustre; is probably not metallic; and bears a great analogy to boron. It is a non-conductor of electricity; it burns if heated in the air, and is converted into silica. Sulphur and chlorine also act upon it. Hydro-fluoric acid is the only acid that will dissolve it.

SIL'IQUA, or **SIL'IQUE** (*siliqua*, a pod: *Lat.*), in Botany, a long narrow seed vessel, shaped like a pod, with a membraneous division called a *replum* along the middle. When ripe it splits open by two valves from the base. When the seed vessel is broad and short it is termed a *silicula*. Seed vessels of this kind are possessed by cruciferous plants.

SILK, and **SILK'-WORM**. Silk, in its original state, is an animal fluid hardened by the air; being an extremely soft and glossy thread, spun by the *Bombyx mori*, or silk-worm. From a small egg, of the size of a pin's head, proceeds a minute dark-coloured worm, the food of which is the mulberry leaf. After casting its skin three or four times, as its bulk increases, it becomes at length a caterpillar about three inches in length, of a white colour, more or less tinctured with blue or with yellow. The period of its existence in this state being arrived, it ceases to eat, and soon begins to form the silken ball which renders it so famous. On the first day of its work, it makes the web, or loose outward silk by which it fastens its nest to the branch, paper, or other substance that nature or art puts in its way. On the second day it begins to form its *folliculus* or ball; and on the third is quite hid by its silk. At the end of ten days, the work is finished, and the transformation of the insect complete. In a state of nature everything now remains quiet till the pupa becomes a moth. Where the insect is bred as an article of trade, the ball is taken from the mulberry tree in the condition at which it is now described to be, and the silk-worm having been killed by heat, is unwound. If the animal were left to itself, it would pierce its way through, and spoil the silk. As soon as the worms have produced their balls, or cocoons, they become an article of commerce; for in those countries where silk is cultivated, few persons reel off their cocoons, but sell them to others, who make this operation a separate business. The silk, as formed by the worm, is so very fine, that if each ball, or cocoon, was reeled separately it would be totally unfit for the purpose of the manufacturer; in the reeling, therefore, the ends of several cocoons are joined and reeled together out of warm water, which, softening their natural gum, makes them stick together so as to form one strong thread.——The first silk known in Europe appears to have been brought from China. For, though a trade in silk began in a very early age, it was not before A.D. 555 that the arts of rearing the worms and working the silk were known to the western world. When silk was first introduced into Rome it was so costly that it sold for its weight in gold, and was only used by a few ladies of the patrician rank. In the beginning of the reign of Tiberius a law was passed, that no man should disgrace himself by the effeminate practice of wearing silken garments; but Heliogabalus broke this law, by wearing a dress composed wholly of silk. The example was quickly followed, and from the capital the practice soon extended to the provinces. Greece was distinguished not only for the rearing of silk-worms, but for the skill and success with which the manufacture was carried on by the inhabitants of Thebes, Corinth, &c. In time it spread to Italy; and in 1480 it was introduced into France. For a long time the English were indebted for silk to foreign nations; James I. endeavoured to introduce the breeding of the silk-worm into this country, but failed; the climate does not appear to be suited to it. But in consequence of the persecution of the Protestants in France, in the year 1685, on the revocation of the edict of Nantes, nearly 50,000 of the inhabitants fled from that country and took refuge in England; and many of them being silk manufacturers, we may trace to them the origin of the *silk trade* in Spitalfields.——As a specimen of individual enterprise in this branch of manufacture, we must notice Sir Thomas Lombe, who, about the year 1719, erected in an island on the Derwent, near Derby, a curious mill for the manufacture of silk, the model of which he had brought from Italy, at the hazard of his life. This machine was deemed so important that, at the expiration of Sir Thomas's patent, parliament voted him 14,000*l.* for the risk he had incurred, and the expense attending the completion of the machinery. It contained 26,586 wheels; one water-wheel moved the whole, and in a day and night it worked 318,504,960 yards of organzine silk thread. Such, however, have been the extraordinary improvements in the arts, that this once wonderful piece of workmanship has been disused for some years; and more efficient machinery erected, which performs twice the work. 12,077,931lbs. of raw silk were imported in 1857; upwards of 33,000 persons, in above 800 manufactories, were engaged in manufacturing it; the value of the imported article was 13,143,839*l.*; and the manufactured article was exported to the value of 2,889,829*l.* Silk changes its name as its manufacture progresses. When wound off the cocoons it is *raw silk*; when one of the reeled threads is twisted to give it strength it is *singles*; when two or more threads are twisted together, it is *tram*, and is generally used as the 'shoot,' or 'weft'; when two or more singles are twisted together, in a direction contrary to their own twist it is *thrown silk*; the process is called *organzining*, the silk thus manufactured *organzine*, and it serves for the 'web' of the best silk stuffs. The silk which the silk-worm first forms, by throwing the thread in different directions, and also that from any cause not reeled off, is *floss* (*filoselle: Fr.*), and is used for carding and spinning.

SILK-COTTON TREES; these are East Indian trees of noble aspect, which belong to the genus *Bombax*, nat. ord. *Sterculiaceæ.* They are so called from the cottony hairs which envelope the seeds. It cannot, however, be employed in manufactures, on account of the shortness of the fibre.

SILK'-THROWER, or **SILK'-THROWSTER**, one who winds, twists, spins, or throws silk, to prepare it for weaving.

SILL (*syl: Sax.*), in Architecture, the horizontal piece at the bottom of a framed case, such as a door or window.——*Ground sills*, the timbers on the ground upon which are placed the posts and superstructure of a wooden building.

SIL'LIMANITE, a greyish-brown mineral, occurring in long, slender, rhombic prisms; found in Connecticut, and named in honour of Professor Silliman. It consists of silica and alumina, with a trace of oxide of iron.

SIL'LON, in Fortification, a work raised in the middle of a ditch, to defend it when it is too wide.

SILU'RIAN SYSTEM, in Geology, a series of formations, belonging to the primary period, so named by Sir R. Murchison from having been studied by him in part of Wales and some contiguous English counties, which were once inhabited by the Silures, a tribe of ancient Britons. It has been divided into three portions, Upper, Middle, and Lower. The Upper Silurian consists of: 1. the Ludlow formation, subdivided into the Upper Ludlow rocks, the Aymestry limestone and the Lower Ludlow rocks; these have a total thickness of probably 2800 feet, and they abound with marine mollusca, especially Brachiopoda, placoid fishes, the oldest piscine remains yet discovered, trilobites, and other crustaceans. 2 The Wenlock formation, more than 2000 feet thick, divided into Wenlock limestone and Wenlock shale. The Middle Silurian rocks consist of the Caradoc formation, composed chiefly of sandstones and shelly limestone, having a total thickness of 2000 feet. The Lower Silurian rocks consist of the Llandeilo formation, composed chiefly of dark calcareous flags, with slates and sandstones, the total thickness amounting to no less than 20,000 feet, the greater part of which has accumulated as mud in a deep ocean The Silurian system has underneath it the CAMBRIAN group, and above it the DEVONIAN series.

SILU'RIDÆ, a large family of malacopterygian fishes, which includes several curious forms. Many of the species are furnished with long filamentary appendages on the head, which serve as feelers. Some small fishes belonging to this family have been expelled from active volcanoes in South America, at a height of 16,000 or 17,000 feet above the sea, a fact that has given rise to much speculation. The *Malapterurus electricus*, a fish living in the Nile and

Senegal, and possessing electrical organs, is also a member of this family. If touched on the head an electrical discharge immediately ensues, causing a pain more or less severe, accompanied by numbness. Even a fish only seven inches long will communicate a shock.

SIL'VER, a well-known precious metal, of a brilliant white colour; next to gold, the most malleable of all metals. It is very tenacious, and soft when pure; it affords leaves not more than the $\frac{1}{100000}$ of an inch thick; and wire much finer than a human hair. It is rendered harder by the addition of a small quantity of copper. Its spec. grav. is 10·5, it is not altered by air or moisture, but is blackened or tarnished by sulphuretted hydrogen. Melted in open vessels it absorbs oxygen, which it gives out in cooling; a small per centage of copper prevents this. It melts at about 1280° Fahr. The only pure acids which act on silver are the nitric and sulphuric; the former dissolves it without the aid of heat; and any gold which may have been combined with the silver remains undissolved, as a black powder. The solutions of the nitrate or sulphate are decomposed by some of the other metals, copper being most convenient for the purpose, and the silver is thrown down in the metallic state. Any solution containing a salt of silver is precipitated, or, if the quantity is small, rendered turbid by chlorine, or a soluble chloride; the insoluble chloride of silver being found, and thrown down. Silver is found in different parts of the earth; but it is in the centre of the Andes, in situations which, though exposed to the perpendicular rays of the sun, are constantly covered with snow, that nature has most abundantly distributed this metal. The silver mines of Mexico and Peru far exceed in value the whole of the European and Asiatic mines; for we are told by Humboldt that three of them, in the space of three centuries, afforded 316,023,883 pounds troy of pure silver; and he remarks that this quantity would form a solid globe of silver, 91,206 English feet in diameter. The most important silver mines of Europe at present are those of Saxony, Hungary, and the Hartz. The annual produce of these united is about 180,000*l.* Within the last quarter of a century there has been a great increase in the produce of silver from the Russian mines. The celebrated mines of Königsberg, in Norway, once so rich in native silver, are now nearly exhausted. Silver has also been obtained from some of the lead mines of Great Britain. Different methods are employed in different countries to extract silver from its ores. In Mexico, Peru, &c., the mineral is pounded, roasted, washed, then triturated with mercury in vessels filled with water; and a mill being employed to keep the whole in agitation, the silver by that means combines with the mercury. The alloy thus obtained is afterwards washed, to separate any foreign matters from it, and then strained and pressed through leather. This being done, heat is applied to drive off the mercury from the silver, which is then melted and cast into bars or ingots. Amalgamation with mercury is practised also in Europe; but it does not answer when the ore contains more than 7 pounds of lead or 1 pound of copper per cent., as the lead would render the amalgamation very impure, and the copper would be wasted. The silver ore is sometimes operated on by a saturated solution of common salt; which at a boiling temperature dissolves chloride of silver, and deposits it when cooled and diluted.

SIL'VERING, the application of silver-leaf to the surface of metals, glass, &c., or the art of covering the surfaces of bodies with a thin film of silver. Copper and brass are the metals on which the silverer most commonly operates. When silver-leaf is to be applied, the methods prescribed for gold leaf are suitable. [See GILDING.]

SIL'VER-TREE, the *Leucadendron argenteum* of botanists, nat. ord. *Proteaceæ*, is shrub growing at the Cape of Good Hope with foliage covered with a dense short pile of white hairs; whence its name.

SIMI'IDÆ (*Lat.*; from *simus*, flat-nosed in Zoology, a family of quadrumanous animals, including those belonging to the old world. The true apes, or those without tails, such as the gorilla and chimpanzee, the long-armed apes [see HYLOBATES], the capped apes of Asia, the monkeys with long tails and large cheek pouches, and the baboons [see CYNOCEPHALUS], all belong to this family.

SIM'ILE (*similis*, resembling: *Lat.*), in Rhetoric, a comparison of two things, which, though different in some respects, agree in others; by which comparison the character or qualities of a thing are illustrated or presented in an impressive light.

SIMO'NIANS, in Church History, a sect of ancient heretics; so called from their founder, Simon Magus, or the magician, who pretended to be the great virtue and power of God, sent from heaven to earth. Their system was a compound of the philosophy of Plato, the mythology of the heathens, and the doctrines of Christianity. They believed in the transmigration of souls, and denied the resurrection of the body. They are considered the first heretics in the church.

SIM'ONY (*simonie*: *Fr.*), in Law, the illegal buying or selling ecclesiastical preferment; or the corrupt presentation of any one to a benefice for money or reward. The word is derived from the *Simon Magus*, the Chaldæan, who, according to the Acts of the Apostles, wished to buy of them the power of working miracles.

SIMOON', a hot suffocating wind, that blows occasionally in Africa and Arabia, and is generated by the extreme heat of the parched deserts and sandy plains. Its approach is indicated by a redness in the air, and its fatal effects are to be avoided, only by falling on the face and holding the breath. [See SAMIEL.]

SIM'PLE CON'TRACT, in Law, a term applied to a contract which is neither ascertained by matter of record nor contained in a deed under seal.

SIMULA'TION (*simulatio*; from *simulo*, I assume the appearance of: *Lat.*), the assumption of a deceitful appearance or character. It differs from *dissimulation*, inasmuch as it assumes a false character, while dissimulation only conceals the true one; but both are justly designated by the word *hypocrisy*.

SIN'APISM (*sinapismos;* from *sinapi*, mustard: *Gr.*), in Medicine, a mustard poultice; a mixture of mustard and vinegar generally applied to the calves of the legs or soles of the feet as a stimulant, and employed in low states of fevers and other diseases.

SIN'CIPUT (*Lat.*, perhaps a contraction of *semicaput*, half the head), in Anatomy, the forepart of the head, reaching from the vertex to the eyes in mammals; and from the vertex to the base of the beak in birds.

SINE (*sinus*, a curved surface: *Lat.*), in Geometry, a right line drawn from one end of an arc perpendicular to the radius drawn to the other end.

SI'NECURE (*sine-cura*, without solicitude: *Lat.*), a church benefice without cure, or care, or guardianship of souls; as where there is a parish without church or inhabitants. The word is applied to any post that brings profit without labour.

SI'NE DI'E (without a day: *Lat.*), in Parliamentary language, a phrase applied to the adjournment of a debate when no date is named for it to be resumed.——In Law, a term applied to a defendant when judgment is given in his favour, and he is suffered to go *sine die*, or dismissed the court.

SINGING. [See MUSIC, MELODY, &c.]

SIN'ISTER (left: *Lat.*), usually signifies *unlucky*, although the Romans understood it in a different sense, a bird or thunder, on the left hand, being considered a lucky omen.——In Heraldry, a term denoting the left side of the escutcheon.——*Sinister aspect*, in Astrology, an appearance of two planets happening according to the succession of the signs; as, Saturn in the same degree as Aries, &c.

SINK'ING FUND. Alarmed by the rapid progress of the National Debt, many persons had proposed schemes for its reduction, and amongst these was the device of a sinking fund, which Dr. Price advocated in a pamphlet published in 1771. In 1786, when Mr. Pitt was Chancellor of the Exchequer, an act of parliament was passed to establish a sinking fund, the plan of which was to set aside a million annually to be invested by commissioners in the purchase of stock. The dividend of the fund so acquired was to go on accumulating for a time, with the final object of being applied in discharge of the national debt. This scheme was carried out for many years, until the commissioners had acquired upwards of 188 millions. But the time came when it was seen that the sinking fund was not only a clumsy but a costly imposture. In those times the debt was increased with fearful rapidity, for the war occasioned expenses that far exceeded the annual income. It is now clear to us that a sinking fund on such a plan is a mere chimera, unless the nation can, in addition to the sums set apart to maintain it, discharge the interest of the existing debt and pay their current expenses. Unless this can be done a new debt may accumulate with twice the rapidity that the old one can be cancelled. The only fund now applied to the cancelling of the national debt is that arising from any chance surplus of income over expenditure.

SIN'NET, or SEN'NIT (*seven knit*), in seamen's language, rope yarn bound about ropes to prevent them from galling. Also, a flat plait of rope yarns, more pliable than, but as strong as, a rope containing the same quantity of material.

SI NON OM'NES (if not all: *Lat.*), in Law, a writ on association of justices, by which, if all in commission cannot meet at the day assigned, it is allowed that two or more of them may proceed to finish the business.

SIN'TER (a scale: *Ger.*), in Mineralogy, a substance which appears under different forms, and is variously designated. *Calcareous sinter* is a variety of carbonate of lime, composed of successive layers, concentric, plane, or undulated. *Silicious sinter* is of a dull grayish white colour, and of a light, brittle, and fibrous texture. These two species of sinter are deposited by hot mineral waters when they come to the surface of the earth. *Opaline silicious sinter* is whitish, with brown, black, or blueish spots, and its fragments appear to be dendritic *Pearl sinter*, or *florite*, has a gray hue, and occurs in cylindrical, stalactitic, and globular masses.

SINTOO, or SINSYU, the original national religion of Japan, upon which Buddhism has been grafted.

SIN'UATE (*sinno*, I curve: *Lat.*), in Botany, an epithet to a leaf that has a margin that curves in and out.

SI'NUS (*Lat.*), in Anatomy, a cavity in a bone or other part, wider at the bottom than at the entrance. The veins of the dura mater are so termed.——In Surgery, a long, hollow, narrow track, leading to some abscess, in which pus is collected.

SI'PHON, or SY'PHON (*siphōn: Gr.*), in Hydraulics, a bent pipe or tube whose ends are of an unequal length; used for drawing liquor out of a vessel, by causing it to rise over the rim. The short end being inserted in the liquor, the air is exhausted by being drawn through the longer one. The pressure of the atmosphere makes the liquor rise to supply the vacuum, till it reaches the top of the vessel, and it then flows over and will continue to run till it is all exhausted. If the syphon is filled with the liquid, and the longer extremity closed until the shorter is placed in the vessel, there will be no necessity for exhausting the air; and it may be kept constantly ready for action, if the fluid is retained in it, by a cock placed in its longer end. The legs of a syphon may be equal, as its action depends on the difference between the length of the column *above* the fluid in the vessel, in one leg, and the length of the column of fluid in the other; as long as the column in the external leg is longer than the unsupported column in the internal leg, the instrument will act; and the liquid will flow with a velocity proportional to this excess of length in the external column.

SIPHO'NIA ELAS'TICA, the systematic name of the tree which produces the South American India rubber. It belongs to the nat. ord. *Euphorbiaceæ*, and it grows only on the low-lands of the Amazon region. In bark and foliage it is not unlike the ash; its trunk, however, is very tall and without branches below. The value of the India rubber annually exported from Para is about 400,000*l*. The rubber that comes to us from India and Africa is the produce of various species of *Ficus*. [See CAOUCHOUC].

SI'REN (*Lat.; from Seirēn: Gr.*), in Antiquity, a fabulous being, something like the mermaids of later times. The sirens are represented by Ovid, &c. as sea monsters, with women's faces and the tails of fish; and by others decked with plumage of various colours. The three sirens were supposed to be the three daughters of the river god Acheloüs by the muse Calliope, and were called Parthenope, Ligea, and Leucosia. Homer mentions only two sirens, and some others reckon five. Virgil places them on rocks where vessels are in danger of splitting. Some represent them as such charming monsters, who sung so harmoniously, that sailors were wrecked on their rocks without regret, and even expired in raptures.——*Siren*, a genus of Batrachian. The *Siren lacertina*, the mud-eel of North America, is shaped like an eel, saving that it has a pair of feet. It has permanent gills as well as lungs. It is allied to the Proteus.

SI'REX, in Entomology, a genus of Hymenopterous insects, of which the Sirex gigas may be considered the type. The extremity of the abdomen is prolonged into a horn.

SIRI'ASIS (*seireasis*; from *seirios*, scorching: *Gr.*), in Medicine, an inflammation of the brain, often proceeding from the intense heat of the sun. It is peculiar to children, and attended with a hollowness of the eyes and a depression of the fontanel, or space between the frontal and parietal bones.

SIR'IUS (*Lat.*; from *seirios*, literally scorching: *Gr.*), in Astronomy, the *Dog-star*, a very bright star of the first magnitude, in the mouth of the constellation of the Great Dog; it is the α Canis Majoris of astronomers. Its distance from us is calculated to be 130,000 millions of miles. This is one of the earliest named stars in the heavens, and is supposed by some to be the nearest to the earth. Hesiod and Homer mention only four or five constellations, or stars, and this is one of them. Sirius and Orion, the Hyades, Pleiades, and Arcturus, comprise almost the whole of the old poetical astronomy. The three last the Greeks formed of their own observation, as appears by the names; the two others were Egyptian. According to some, Sirius was so called from the Nile, one of the names of that river being Siris; and the Egyptians, seeing that river begin to swell at the time of a particular rising of this star, paid divine honours to it, as the star of the Nile.

SIROC'CO (*Ital.*), a periodical wind which generally prevails in Italy and Dalmatia every year, about Easter. It blows from the south-east by south, and is attended with heat, but not rain; its ordinary period is twenty days, and it usually ceases at sunset. When the sirocco does not blow in this manner, the summer is almost free from westerly winds, whirlwinds, and storms. The wind is prejudicial to plants, drying and burning up their buds; and also causes an extraordinary weakness and lassitude in men.

SIRVENTE, poems of the Provençals, the object of which was war, politics, or satire. They usually consisted, like the *chansons* or love songs, of five stanzas and an envoy.

SIS'TRUM (*seistron*, from *seis*, I shake: *Gr.*), in Antiquity, a musical instrument, of an oval shape, used by the Egyptians in the worship of Isis. It was a kind of timbrel.

SIVA, the third of the Hindoo triad of divinities, who amongst a thousand names bears also that of Mahadeva. His worshippers are spread over India, and the sects are very numerous. The greatest confusion exists as to his attributes; now he is said to be the destroyer, and now the creative principle. The chief mark of his worship is the linga, a conical black stone, which is to be seen in all his temples. He has appeared on earth in various avatars (incarnations), like Vishnu. He is represented with five faces, from four to ten hands, with a third eye in the middle of the forehead, with earrings of snakes, and a collar of skulls. As the lord of dread he is rendered as hideous as possible. In one of his characters he delights in bloody sacrifices, and with reference to this the temple of Juggernaut was built, and the notoriously cruel rites of the devotees practised. His consort Sakti was the goddess of the THUGS.

SIVATHE'RIUM (*Siva*, and *thērion*, a wild beast: *Gr.*), an extinct genus of ruminant animals, the fossil remains of which have been found in the tertiary strata of the Sivalik sub-Himalayan range. They were larger than any known ruminant, and had four horns.

SIXTH, in Music, an interval formed of six sounds, or five diatonic degrees. There are four kinds of *sixths*: two *consonant* and two *dissonant*.

SIZAR, the lowest class of students at Cambridge, &c. Sizars have usually free commons, and receive various emoluments, through the benefactions of founders and others. The name is derived from the college word *size*, the portion of bread, meat, &c., allotted to a student. [See SERVITOR.]

SIZE (*sisa: Ital.*), a glutinous substance prepared from different materials, and used by plasterers, painters, and others. It is made from the shreds and parings of leather, parchment, vellum, &c.

SIZ'EL, in Coining, the residue of bars of silver, or other metal, after the pieces are cut out for coins.

SKALDS (*Skalda*, ancient *Norsk*), ancient Scandinavian poets who lived from the tenth to the thirteenth century. 'One of the chief features of the Skaldic poetry (says Max Müller) was this, that nothing should be called by its proper name. A ship was the beast of the sea; blood, the dew of pain, or the water of the sword; a warrior was an armed tree, the tree of battle; a sword, the flame of wounds. In this poetical language there were 150 names for Odin; an island could be called by 120 synonymous titles.'

SKATE, the popular name of some cartilaginous fishes of the genus *Raia*, to which the rays also belong. What is called the *True skate* is the *Raia batis* of ichthyologists, a voracious fish which sometimes is taken of the weight of 200lbs. It is used as food.

SKEL'ETON (a dried body: from *skello*, I make dry: *Gr.*), in Anatomy, a collection of the bones of an animal cleansed, disposed in their natural situation, and kept in that order by means of wires, &c. When the bones are connected by the natural ligaments, it is called a natural skeleton; when by other means, it is termed an *artificial* skeleton.

SKEW BACK, in Architecture, the sloping abutment, in brickwork or masonry, for the ends of the arched head of an aperture.

SKEW BRIDGE. When an arch is carried across a road or stream at any angle other than a right angle, it is made askew, and its figure is derived from that of a symmetrical arch by distortion in a horizontal plane. Railway bridges are frequently skew bridges.

SKIN, in Anatomy, one of the principal integuments of the body, consisting of three layers composed of cells; namely, the *epidermis cuticle*, or scarf skin, which is the outermost; the *rete mucosum*, or second; and the *cutis vera corium*, this being the part which forms leather when tanned. There are many papillæ upon it, and in these the nerves of general sensation terminate. There is also a network of blood-vessels which forms what is called the vascular layer. The epidermis is insensible, being destitute both of nerves and blood-vessels. This is the layer of which the scales of reptiles, the nails and claws of mammals, and the hard casing of crustaceans, are modifications. The scales of fishes and the feathers of birds grow from the vascular layer *cutis vera*, or real skin, the third. On viewing the surface of the skin, even with the naked eye, we find it porous; more so in some places than others; and the pores are also larger in some parts than others. Some of these pores are ducts of sebaceous glands, and others serve not only to transmit hairs, but, it is supposed, the greatest part of the perspirable matter itself. The *rete mucosum* gives the colour to the skin; it is black in the negro [See NEGRO]; white, brown, or yellowish, in the European. The skin is extremely distensible and elastic; it is thickest on those parts which bear weight and pressure; for example, on the back, the soles of the feet, and the palms of the hands; thinner on the forepart of the body, on the insides of the arms and legs, and where two surfaces touch.——SKIN, in Commerce, the hairy or other membrane stripped off any animal to be prepared by the tanner, skinner, or parchment-maker.

SKINK (*skinkos*: *Gr.*), a scaly reptile of the lizard order, the *Scincus officinalis* of zoologists. It is from six to eight inches long, and of a yellowish colour, with black cross bands. It lives on insects and haunts sandy places in Africa, in Sicily, and some of the Greek islands. It was formerly used as a remedy in various diseases.

SKOL'IZITE (*skolios*, twisting: *Gr.*), a mineral, occurring crystallized, and massive, colourless and nearly transparent. When a small portion of it is placed in the exterior flame of a blowpipe it twists like a worm, becomes opaque, and is converted into a glassy substance.

SKOR'ODITE (*skorodon*, garlic: *Gr.*), a mineral of a greenish colour. It occurs massive, but is generally crystallized in rectangular prisms. It is an arseniate of iron; and resembles one of the arseniates of copper. When heated, it emits the odour of garlic.

SKULL, the bony covering of the brain. [See CRANIUM.]

SKUNK, the *Mephitis Americana* of zoologists, a carnivorous quadruped, about the size of a cat, and allied to the weazel and badger. It inhabits most parts of North America, and is remarkable for the intolerable stench which it emits when threatened with danger, and which is its defence against its enemies. Such, indeed, is the offensive nature of the fluid which the skunk ejects, that the smallest drop is sufficient to render clothes unwearable for a great length of time. The genus is exclusively American.

SKY'-SCRAPER, in Ships, a small triangular sail sometimes set above the royal.

SLAB, in Carpentry, an outside plank or board sawn from the sides of a tree, which is frequently of very unequal thickness.——In Masonry, a table of marble, for hearths and other purposes.

SLAM, in Chemistry, a substance frequently produced in the making of alum, by calcining it too much or too little.

SLATE (*slith*, flat: *Sax.*), a kind of stone of a blueish or grey colour, which when first dug from the quarry is of soft texture, and is easily cut or split into plates for covering the roofs of houses, paving, &c. The blue slate is very light and durable; the gray is much more lasting than tiles. The slate principally in use is brought from Wales. Some other kinds also are employed, the best of which is the Westmorland slate.——*Drawing slate, or black chalk*, has a grayish black colour; is very soft, sectile, easily broken, and adheres slightly to the tongue. It occurs in beds in primitive and transition clay slate; also in secondary formations. It is used in crayon drawing, its trace upon paper being black and regular.——*Whet slate, or Turkey hone*, is a slaty rock, containing a great proportion of quartz, in which the component particles are so very small as to be scarcely discernible.——*Mica slate* is composed of the minerals mica and quartz, the mica being generally predominant

SLATY CLEAVAGE, a structure possessed by many slate rocks, by which they are fissile into thin plates in a direction different from the planes of stratification and the planes of the joints. This structure, so long a puzzle to geologists, has at last received a satisfactory explanation at the hands of Professor Tyndall, who has shown that it is the result of great pressure applied laterally at right angles to the cleavage planes in rocks composed of fine particles.

SLAVERY (*sclaverey;* from *sklave*, a slave: *Ger.*), the establishment of a right in one man over the liberty, property, and sometimes even life of another. A state of slavery is opposed to the whole nature of man, and has always been attended with evil both to the slave and his master. The English word is simply the name of the Sclavonian race. The wars of the Frank kings and emperors filled Saracenic Spain with Sclavonic captives to such an extent that in its language, as well as in those of Europe, a natural name meaning, in its own tongue, *glorious*, became the title of servitude. Among the Romans, when a slave was set at liberty, he took the *nomen* or *prenomen* of his master, to which he added the *cognomen*, by which he had been called before he became free. The African slave-trade was commenced by the Portuguese in 1442; it was, however, of only trifling extent till the 16th century. But the importation of negroes into the West Indies and America having once begun, it gradually increased, until the vastness and importance of the traffic rivalled its cruelty and guilt. In 1787 a parliamentary committee having been formed, such a mass of evidence was collected in proof of the enormities produced by the slave-trade, that a great impression was made on the public mind. By the zealous perseverance of Messrs. Granville Sharp, Clarkson, and Wilberforce, supported as they were by Burke, Pitt, Fox, and other distinguished men in both houses of parliament, this feeling was not suffered to die away; and though the struggle continued year after year, with varied success, the friends of humanity ultimately triumphed; a bill for the total and immediate abolition of the slave trade having, in 1807, been carried in both houses by immense majorities. This great question was not, however, wholly set at rest; for though the abolition of the slave-trade was effected, the liberation of the unhappy beings already in a state of slavery was not. But by the statute 3 & 4 Will. IV. c. 73, it was enacted, that on the 1st of August, 1834, slavery was to cease throughout the British dominions, and that the then existing slaves were to become apprenticed labourers; the term of their apprenticeship partly ceasing on the 1st of August, 1838, and partly on the 1st of August, 1840; when the black and coloured population became altogether free. To attain this mighty object, the sum of 20,000,000*l.* was distributed in certain proportions and according to certain conditions to the planters, as a compensation for the loss of their slaves. The horrors of the voyage from the land of his birth to that in which the wretched negro was doomed to spend the residue of his existence can scarcely be conceived. One of the slave ships in 1829 is described as having taken in, on the coast of Africa, 336 males, and 226 females, making in all 562. She had been out seventeen days, during which she had thrown overboard fifty-five. The slaves were all enclosed under grated hatchways, between decks. The space was so low that they sat between each other's legs; and they were stowed so close together that there was no possibility of their lying down or at all changing their position by night or day. As they belonged to, and were shipped on account of, different individuals, they were all branded like sheep, with the owners' marks of different forms. These were impressed on their breasts, or on their arms, burnt with a red-hot iron! Over the hatchway stood a ferocious looking fellow, with a scourge of many-twisted thongs in his hand, who was the slave-driver of the ship; and whenever he heard the slightest noise below he shook it over them, and seemed eager to exercise it. These poor creatures were packed up and wedged together in cells, only three feet high, so that they had not more than 23 square inches for each man, and 13 inches for each woman; while the heat of these horrid places was so great, and the odour so offensive, that it was quite impossible to enter them even had there been room. Another case which may be mentioned in illustration of the subject is that of a Spanish brig, in 1840. She had originally 900 slaves on board, but during a hurricane the hatches had been battened down, and on opening them 300 were found to have died from suffocation. Again the hurricane came on; the hatches were battened down a second time, and the consequence was, that 300 more of the slaves perished from the same cause, and 100 of the remaining 300 died on the passage, to Mosambique harbour.

SLED, SLEDGE, or **SLEIGH** (*sleeg: Sax.*), a carriage or vehicle moved on runners, and much used in North America while snow is on the ground. It is drawn with great facility where the use of a wheeled carriage of any kind would be impossible; and it forms the only mode of communication in the backwoods and unreclaimed districts, where roads have not been made. It affords an easy and pleasant mode of conveyance; and the season of sleighing is one of mirth and enjoyment. As the passage of this vehicle through the track which is soon made in the snow is noiseless, the animals which draw it are decorated with bells, to give notice of their approach. In England the word *sledge* is most commonly used; in America, where it is the only vehicle seen while the snow continues, it is called a *sleigh*. In Lapland the sledges are drawn by reindeer.

SLEEP (*sleepan*, to sleep: *Sax.*), one of the most mysterious phenomena in the animal world, a state in which the body appears perfectly at rest, and external objects act on the organs of sense without exciting the usual sensations. The voluntary exertions of our mental and corporeal powers being suspended, we are unconscious of what passes around us; and are not affected by the ordinary impressions of external objects. Sleep is generally attended with a relaxation of the muscles, but the involuntary motions, as respiration and the circulation of the blood, are continued. When sleep is only partial, that is, when the brain does not fully participate in it—which is known by distinctly remembered and painful and troublesome dreams—the refreshment it produces is greatly lessened. In childhood and in perfect health we dream but little; or at least so imperfectly and so slightly that the impressions experienced are scarcely recollected. ——*Sleep of Plants*, the folding of their leaves, and drooping appearance in the night. This is more strikingly seen amongst those with pinnate leaves, such as the acacias.

SLEEP'ER, in Architecture, a piece of timber on which the ground joists of a floor are laid. The term was formerly used to indicate also the valley rafters of a roof. ——In Railway Engineering, the transverse pieces of timber or iron, to which the *chairs*, in which the rails are laid, are fixed, are called sleepers.——In Ship-building, a thick piece of timber, placed longitudinally in a ship's hold, opposite the several scarfs of the timbers, for strengthening the bows and sternframe, particularly in the Greenland ships; or a piece of long compass timber layed and bolted diagonally upon the transoms.

SLEET, in Gunnery, the part of a mortar passing from the chamber to the trunnions; so contrived as to give additional strength. ——A fall of rain and snow together in fine particles.

SLEIGH. [See SLED.]

SLEIGHT OF HAND, tricks performed by persons who, through great practice, obtain a manual dexterity which enables them to effect what is apparently out of the course of nature.

SLI'DING-RULE, a mathematical instrument, used to determine measure or quantity without compasses, by sliding the parts one by another. It is used chiefly in gauging, and for the mensuration of timber.

SLIP, a place lying with a gradual descent on the banks of a river or harbour, convenient for ship building.——In Horticulture, such portions of plants as are slipped off from the stems or branches for the purpose of being planted out as sets.

SLIT'TING-MILL, a mill where iron bars are slit into nail rods, &c.

SLOE (*sla: Sax.*), a small wild plum, the fruit of the *blackthorn*, the *Prunus spinosa* of botanists, nat. ord. *Drupaceæ*.

SLOOP, a vessel of one mast, the mainsail of which is attached to a gaff above, to a boom below, and to the mast on its foremost edge; differing from a cutter by having a fixed bowsprit and a jib-stay.——*Sloop of war*, a vessel rigged either as a ship, brig, or schooner, and usually carrying from 10 to 18 guns.

SLOPS (*slop*, a covering: *Sax.*), in seamen's language, a name given to all species of wearing apparel, bedding, &c., which are supplied to royal ships in commission.

SLOTH (*slæwth: Sax.*), or AI, the *Bradypus torquatus* of zoologists, an herbivorous edentate quadruped of South America, proverbial for the slowness of its motions; but it climbs more easily than it walks, and seems quite at home when resting suspended on the branches of trees. The fore-feet or arms are much longer than the hinder and when the sloth is on the ground it is obliged to draw itself along upon its elbows.

SLOUGH (*slog: Sax.*), in Surgery, the dead part which separates from the living in mortification; or the part that comes away from a foul sore; hence the term *to slough off*. Also (with the same pronunciation), the skin or cast skin of a serpent.——*Slough* (pron. *slou*), a place or hole full of deep mud or mire.

SLOW'-WORM. [See BLINDWORM.]

SLUG, the popular name of snails with small or rudimentary shells, well known as pests in gardens. They form the genus *Limax*, and some allied genera amongst gasteropod molluscs. Also, a cylindrical cubical, or irregularly shaped piece of metal shot from a gun.

SLUICE (*escluse: Fr.*), the stream of water issuing through a flood-gate. The word is, however, used indiscriminately either for the stream that passes through the flood-gate, or the gate itself.

SLUR, in Music, a mark connecting notes that are to be sung to the same syllable, or made in one continued breath of a wind instrument, or with one stroke of a stringed instrument.

SMALL-POX, in Medicine, a very contagious pustular disease. It is found in two forms: the distinct and the confluent. *Distinct small-pox*, in which the pustules are separate, begins with pains in the back and loins, drowsiness, headache, and the other symptoms of *inflammatory* fever. The spots are first red and small, then become little vesicles, and about the eleventh day attain their full size, that of a pea; the throat after some days becomes sore, and the face swollen; the swelling of the face is then transferred to the feet and hands; the pustules ultimately break, and if they were large, leave an indentation; the remaining symptoms gradually subside, and the secondary fever disappears about the seventeenth or eighteenth day. *Confluent small-pox*, in which the pustules coalesce, is ushered in by a fever of a *typhoid* character; the symptoms are aggravated; the eruption proceeds very irregularly; the fever does not, as in the distinct kind, cease on the appearance of the eruption, but, on the contrary, are aggravated; the eruption becomes livid, and purple spots are perceived; about the eleventh day it often terminates fatally. Small-pox is the effect of a specific contagion, produced either by innoculation or exposure to the effluvia from persons suffering under it. [See VACCINATION.]

SMALTS, or SMALT (*schmalz: Ger.*), a beautiful blue colour obtained by fusing together glass and oxide of cobalt; it is used in paper-making and various other arts, particularly in the painting of earthenware. The inferior kinds are made by fusing mixtures of zaffre, sand, and pearlash.

SMAR'AGD (*smaragdos: Gr.*), another name for the *emerald*. Hence, *smaragdine*, an epithet for anything pertaining to or resembling an emerald; of an emerald green. The ancients used the word in a far more extended sense. Thus Nero is said to have viewed the combats of the Gladiators in a *smaragd*, which is supposed to mean a polished mirror.

SMARAG'DITE (*smaragdos*, the emerald: *Gr.*), in Mineralogy, a variety of *hornblende*.

SMELT, a marine fish of delicate flavour, the *Osmerus eperlanus* of ichthyologists. It is allied to the salmon, and is usually taken of the length of six or seven inches.

SMEL'LING, that sense which resides in the nerves distributed over the membrane that lines the interior of the nostrils. It is far more strongly developed in some animals than in others. Volatile particles chiefly are distinguished by smell, and fixed ones by the taste.

SMELT'ING (*smelter*, to melt ore: *Belg.*), in Metallurgy, the exposure of metallic ores to heat in order to melt out the metallic from the earthy, stony, and other parts. The art of fusing the ores, after roasting, is the principal and most important of metallurgic operations.

SMI'LAX (*Gr.*), in Botany, a genus of plants, nat. ord. *Smilaceæ*. Most of the species are climbing shrubs. The sarsaparilla of the Materia Medica is the root of some South American species.

SMOKE, the visible vapour or exhalation that is expelled from a substance while burning; or the rarefied, but undecomposed part of a combustible. The smoke emitted by fuel may be considered as so much waste of its most valuable portions. A scientific application of the principles on which combustion depends is quite sufficient to prevent the production of smoke. The word *smoke* is particularly applied to the volatile vapour expelled from coal, wood, vegetable matter, &c.; that which exhales from metallic substances being more generally called *fume*.

SMOKE-JACK, a machine consisting of an arrangement of wheels put in motion by the draught of the chimney with force sufficient to turn a vane.

SMUT (*smitta: Sax.*), in Husbandry, a disease in corn, when the grains, instead of being filled with flour, contain foul black powder. This is produced by a minute fungus called *Uredo segetum* by botanists.

SNAIL, the name given to Gasteropod molluscs, belonging to the genus *Helix*. The number of species is astonishingly great, almost every country having some peculiar to it, whilst several species have a large geographical range. The animal carries four tentacles on its head, all retractile at pleasure. The upper two have eyes at their summits. They are able to draw themselves entirely into their shells, which vary considerably in form and sculpture. Snails are very tenacious of life; Dr. Baird mentions an instance of a specimen from Egypt, having been glued down by its shell to a tablet in the British Museum for four years before it was discovered to be alive. The common garden snail, *Helix aspersa*, may be taken as an example.

SNAKE, the common and general name of serpents; but, in England, generally applied to those which are oviparous. [See SERPENTS.]

SNA'KEROOT, the *Aristolochia serpentaria*, a species of *birth-wort*, growing in North America. Its medicinal virtues are considerable, and its general action is heating and stimulant.

SNA'KEWEED, a plant of the genus *Polygonum: bistort*.

SNA'KEWOOD, the smaller branches of the *Strychnos colubrina*, a tree growing in the isle of Timor and other parts of the East; having a bitter taste, and supposed to be a certain remedy for the bite of the hooded serpent.

SNATCH'BLOCK (*snacken*, to seize hastily: *Dut.*), in ships, a great block or pulley, having a shiver cut through one of its cheeks, for the ready receiving of any rope. It is chiefly used for heavy purchases, where a warp or hawser is brought to the capstan.

SNEE'ZING, a convulsive action of the organs of respiration, produced by irritation of the nostrils. Violent fits of sneezing have been known to prove fatal; in severe cases, the nasal membrane should be soothed by applying warm milk and water, or a decoction of poppies.

SNIPE, the name of some British grallatorial birds, belonging to the genus *Scolopax*, of which the common snipe (*S. gallinago*) and the Jack snipe (*S. gallinula*) are the best known. They haunt marshy tracts and are much sought after by sportsmen.

SNOW (*snaw: Sax.*), in Meteorology, a congelation of vapour produced in the middle region of the air, when the temperature of the atmosphere sinks below the freezing point of water. The manner in which snow is produced is not well understood. It has not been ascertained whether the clouds which give rise to it are composed of vesicular vapours, or frozen particles; nor whether the flakes are completely or only partially formed before it begins to descend; nor is it known what temperatures or circumstances give rise to its different appearance. Upon examining snow flakes they are found, with rare exceptions, to be masses of beautifully formed crystals. Their variety is endless, but the principal forms are stars of six points, from one-third to one-thirty-fifth of an inch in diameter.——*Red snow*. It was observed, even by the ancients, that snow is sometimes of a red colour. This is now known to be due to the presence of a minute fungus named *Protococcus nivalis* by botanists. It has been found in many parts of the world.

SNOW, LIMIT OF PERPETUAL, a term of physical geography, referring to an imaginary line on the earth where the temperature is never below 32° F. This limit cannot be defined in a given region with strict accuracy, and all statements regard ing it can be approximate only. It is best determined where the accumulations are continuous upwards on gentle slopes. Accumulations in hollows and descending glaciers are very frequently below the limit, and hence the line is often laid down too low in mountainous regions. On the other hand, steep surfaces exposed to the sun or to moist winds are frequently destitute of snow, although above the limit in question. In the northern hemisphere the snow line sinks to the level of the sea about the parallel of 80°, and at the equator it is upwards of 16,000 feet above the sea. It is much higher on the northern slopes of the Himalayas than on the southern. This is occasioned by the fact that the rainwinds all come from the south, and that the greater part of their moisture is deposited before they arrive at the north side of the range where the air is very dry.

SNUFF, pulverized tobacco, variously prepared, scented, and distinguished by a multitude of names. It is so frequently adulterated with deleterious substances that mischievous consequences must necessarily arise from its use, in addition to those which naturally flow from employment of a narcotic powder in this way.

SOAP (*sapōn: Gr.*), a substance obtained by the action of alkalies on oils or fats. *White soaps* are generally manufactured from oil of olives and carbonate of soda, the latter being rendered caustic by quicklime, and its solution being termed *soap ley*. The oil and alkaline liquid are boiled together, until the soap begins to separate from the water, salt being sometimes added to promote granulation; the whole is allowed to rest for some time; the soap is then transferred into wooden frames, and when stiff enough is cut into oblong slices and dried. Perfumes are sometimes added; and marbling, when desirable, is effected by stirring into the soap during manufacture a solution of sulphate of iron, which is decomposed, black oxide separating in streaks and patches. *Common soap* is made of soda and tallow; or if potash is used, common salt is added to harden it by transference of soda. *Soft soaps* are generally made with potash and fish oil. *Yellow soap* contains resin. Soap is soluble in pure water and in alcohol: the solution in the latter gelatinizes when concentrated, forming what is called in medicine *opodeldoc*. If the soap solution is carefully evaporated, *transparent soap* is obtained. Earth and common metallic oxides form *insoluble soaps*: and hence soap is wasted, and precipitates are formed with it, by hard water—that is, such as contains lime. Soap, if kept in a damp place, is capable of remaining combined with a large quantity of water; this adds to its weight, and diminishes its utility, by rendering it liable to waste during use.

SOAP'STONE, in Mineralogy, *Steatite*, a soft mineral of a soapy feel. It is a hydrated silicate of magnesia and alumina.

SOAP'WORT a plant of the genus *Saponaria*: nat. ord. *Caryophyllaceæ*.

SOC'AGE (*soke*, a plough: *Ang. Sax.*), in Law, a tenure of lands by any certain and determinate services. In *free socage* the services were, in a feudal sense, not dishonourable, as the payment of an annual rent. In *villein socage*, lands were held by villein services; and these being certain and determined, the tenure was, in some respects, copyhold, and it still subsists.

SO'CIALISM (*socialis*, pertaining to companionship: *Lat.*), the science of reconstructing society on entirely new bases, or the substitution of the principle of co-operation for that of competition, in every branch of human industry. This view of society is not of recent date. It has been the favourite theme of poets from the earliest ages. But the first attempt to carry it into practical effect was made by the Saint Simonians in France about 1820, who gained numerous adherents, especially in Paris. After the revolution of July 1830, it rose rapidly into notoriety, from the sympathy between the notions which it promulgated, and those entertained by many of the republican party. The views of the St. Simonians were all directed to the abolition of rank and property in society, and the establishment of associations such as the followers of Mr. Owen in this country have denominated co-operative, of which all the members should work in common, and divide the fruits of their labour; and with these notions, common to many other social reformers, they united the doctrine that the division of the goods of the community should be in due proportion to the merit or capacity of the recipient. But their doctrines and proceedings soon became licentious and immoral; and in 1832, their association was dispersed by Government. Some former members of this body attained to places of rank and consideration; and others founded new schools of socialism and communism.

SOCI'ETY (*societas*; from *socio*, I associate: *Lat.*), in its usually restricted sense, an association organized for the promotion of some object. If formed for commercial purposes, it is usually called a *Company*. Literary societies are often termed *Academies*; societies for social purposes *Clubs*, sometimes political, and sometimes devoted to certain classes. There are about forty clubs in London, the number of members varying from 1000 to 1500, admitted by ballot; paying from ten to twenty-five guineas on admission, and from five to ten guineas annual subscription. Benevolent associations in this country are very numerous.

SOCK (*soccus*: *Lat.*), the low-heeled light shoe of the ancient actors in comedy. Hence the word is used for comedy, and opposed to *buskin* or tragedy.

SOC'LE (*zoccoli*, a shoe: *Ital.*), in Architecture, a square member, having a greater breadth than height. It is used to support a column, base, &c., instead of a pedestal, from which it differs, by having neither base nor cornice.

SOCRATIC PHILOSOPHY, in its proper signification, the peculiar method which was applied by Socrates to philosophical inquiry. His object was to stimulate his hearers to the pursuit of the good and the true by new and more comprehensive methods. He began his discourses by propositions generally received as true; and placed a particular idea in a number of combinations. He then proceeded by means of questions to ascertain the ideas of those with whom he was contending. So full of error were the speculations of his age that it was not difficult to entangle his opponent in contradictions, or to extract from him admissions which were inconsistent with his opinions, or agreeable to the sentiments of Socrates, who with his comprehensive views and dialectic ability, soon turned them to account. Socrates wrote nothing himself; we have only the reports of Xenophon and Plato, and the latter is thought to have added much of his own.

SO'DA, an alkali, the oxide of the metal *sodium*, obtained, usually as a carbonate, from several sources. It is sometimes found in a native state, as in the lakes in Egypt, which, being dried by the heat of the sun, leave beds of soda, or natron, as it is there called. Soda was formerly procured as *Barilla*, from the incinerated ashes of the *salsola* plant, and as *kelp* by burning seaweed; but it is now almost entirely obtained by decomposing common salt with sulphuric acid or iron pyrites. The resulting sulphate is fused in a furnace with chalk and small coal, and the carbonate of soda is then dissolved out of the product.——*Caustic Soda* is the oxide, and is obtained from the carbonate by boiling it with lime. Soda, in one form or other, has an immense number of applications in the arts.

SO'DALITE, a mineral of a bluish green colour, found crystallized, or in masses. It obtains its name from the large portion of soda which enters into its composition. It consists chiefly of silex, alumina, and soda.

SO'DA-WATER, a supersaturated solution of carbonic acid in water. It derives its name from having been always formerly, and sometimes at present, prepared by the addition of some carbonate of soda, to render it useful in certain forms of dyspepsia. Some ingenious machines are employed in the manufacture of soda-water.

SO'DIUM, the metallic base of soda, is obtained by raising a mixture of the carbonate and charcoal to a high temperature. It is white, opaque, and has the lustre and general appearance of silver. Its spec. grav. is 0·97; it fuses at 194°. It is exceedingly malleable, and is much softer than any of the common metallic substances. It conducts electricity and heat in a similar manner to the basis of potassa, which it very much resembles; and small particles of it inflame by the galvanic spark, and burn with bright explosions. When sodium is exposed to the atmosphere it immediately tarnishes, and by degrees becomes covered with a white crust, which is the oxide. Sodium combines with the metals; in the quantity of one-fortieth it renders mercury a fixed solid of the colour of silver, and the combination is attended with a considerable degree of heat. It forms an alloy with tin, without changing its colour; and it acts upon gold and lead when heated. Placed upon cold water it decomposes the liquid with violence; with hot water it inflames.

SOF'FIT (*soffitta*, overlaid: *Ital.*), the ceiling of subordinate parts of buildings, such as staircases, entablatures, archways, cornices, &c.

SOFI (probably a corruption of *sophos*, wise: *Gr.*), a Persian word, signifying religious persons, called also *Dervishes*. It was the surname of the kings of Persia, of the race preceding the present family, and came to be erroneously used as a title of the Persian monarch.

SOIL, the earthy materials in which plants grow; consisting of compounds of silica, lime, alumina, magnesia, oxide of iron, and various acid and alkaline combinations; with the remains of animal and vegetable matter; the variety being necessary to healthy vegetation. The part beneath that where plants usually grow is termed the *subsoil*. All soils were originally the product of disintegrated rocks—on whose nature and constitution they depend for their peculiar qualities.

SOKE (a plough: *Ang. Sax.*), in Law, a term which anciently had various significations, viz. 1. The liberty or privilege of tenants excused from customary burdens and impositions. 2. The power of administering justice. 3. The precinct in which the chief lord exercised his *soc*, or liberty of keeping court within his own jurisdiction. 4. A stipulated payment or rent to the lord for using his land, with such liberty and privilege as made the tenant the soke man or freeholder. As a territorial division it still exists in Lincolnshire.——SOKE-MEN, tenants of sokage lands: those who held by no servile tenure, but paid their rent as a soke, or sign of freedom.——SOKE-REEVE, the rent collector in the lord's soke.

SOLANA'CEÆ, a natural order of plants, including more than a thousand species. The flowers are monopetalous and regular; the fruit either a capsule or a berry. They are found in most parts of the world, some affording food, others medicines. Many of them possess narcotic properties to such an extent as to be poisonous. The genus *Solanum* has upwards of 900 species, and one of these is the valuable POTATO, and another the poisonous *Bitter sweet*. To other genera belong the TOBACCO plant (*Nicotiana*), the TOMATO (*Lycopersicum*), the Cape gooseberry (*Physalis*), the Red Peppers (*Capsicum*), the HENBANE (*Hyoscyamus*), the Thorn Apple (*Datura*), the Night Shade (*Atropa*), the MANDRAKE, and the handsome Petunia.

SO'LAN-GOOSE. [See GANNET.]

SOLA'RIUM (*Lat.*, from *solaris*, pertaining to the sun), in Antiquity, a place on the tops of houses exposed to the sun, where the Romans used to take air and exercise.

SO'LAR SYSTEM, that system of astronomy which is founded on the hypothesis that the sun is the centre of the universe, round which all the planets revolve at different distances, and in different spaces of time. [See ASTRONOMY, EARTH, SUN, PLANETS, MOON, &c.]

SO'LDAN (corrupted from *Sultan*), a title formerly given to a general who commanded the caliph's army; the epithet was afterwards applied to a governor of Egypt.

SOL'DERING (*solido*, I make firm: *Lat.*), among Mechanics, the uniting together two pieces of metal, by the fusion and application of some metallic composition on the extremities of the metals to be joined. Common solder is an alloy composed of about two parts of lead and one of tin. In the operation of soldering, the surfaces of the metal intended to be joined are scraped and rendered very clean; they are then brought close to each other. Some resin, chloride of zinc, borax, or other suitable substance having been previously placed on the places to be joined; and heat is applied by a soldering iron, or in some other way.——SOLDERS are made of gold, silver, copper, tin, bismuth, and lead; usually, but not always, in the composition some of the metal that is to be soldered being included.

SOLE, the name given to flat fishes of the genus *Solea*. The common sole abounds on the British coast; afford considerable employment to the fishermen, and are much esteemed as an article of food.

SOL'ECISM (*soloikismos*: *Gr.*), in Grammar, incongruity of language, or a gross deviation from the rules of grammar, or construction. According to Pliny it differs from a *Barbarism*, in not being confined to the use of single words, which are erroneous.——In a general sense, any unfitness or impropriety.

SOLENA'CEANS (*sōlēn*, a tube: *Gr*), a family of dimiary bivalve molluscs, of which the genus *Solen*, comprising the razor shell, is the type.

SOLFATA'RA, a volcanic vent which emits only sulphur, and its compounds; and so named from the *Solfatara*, a hill near Naples, in the district called by the ancients the *Phlægræi Campi*.

SOLI'CITOR (*solicito*, I persuade: *Lat.*), in Law, a person authorized and employed to prosecute the suits of others in the Court of Chancery; similar practitioners are called *attorneys*, in courts of common law. In Scotland solicitors are the same as attorneys with us; but they practise in the inferior courts and are inferior to *writers to the signet*.——SOLICITOR-GENERAL, an officer of the crown, holding by patent, ranking next to the attorney-general. Like the attorney-general, he resigns office when the ministry which appointed him retires.

SOL'ID (*solidus*, firm: *Lat.*), in Philosophy, a body whose parts are so connected together as not to give way or slip from each other upon the smallest impression, in which sense *Solid* stands opposite to *Fluid*.——Geometricians define a solid to be the third species of magnitude, or that which has three dimensions, *viz.* length, breadth, thickness or depth.—*Solids* are commonly divided into *regular* and *irregular*. The *regular* solids are those terminated by regular and equal planes, and are only five in number, *viz.* the Tetrahedron, which consists of four equal triangles; the Cube, or Hexahedron, of six equal squares; the Octahedron, of eight equal triangles; the Dodecahedron, of twelve; and the Icosahedron, of twenty equal triangles. The *irregular* solids are almost infinite, comprehending all such as do not come under the definition of regular solids; as the sphere, cylinder, cone, parallelogram, prism, parallelopiped, &c.——In anatomy and medical science, the bones, flesh, and vessels of animal bodies are called *solids*, in distinction from the blood, chyle, and other fluids.——*Solid Angle*, one made by the meeting, in one point, of more than two plane angles which are not in the same plane. *Solid square*, in military language, a body of troops formed into a square, consisting of a number of parallel squares one within the other. The faces of the men in each set of parallel sides look the same way, and towards the outside of the square, holding their bayonets so as to be prepared for the attack of an enemy attempting to force the square. The solid square has been found capable of resisting even a furious charge of cavalry.

SOLIDA'GO (*solido*, I make firm: *Lat.*, from its supposed efficacy in healing wounds), in Botany, a genus of plants, nat. ord. *Compositæ*. Plants of this genus are distinguished by the name of the golden rod, on account of their yellow flowers and long spikes.

SOLIFID'IAN (*solus*, alone; and *fides*, faith: *Lat.*), in Theology, one who maintains that faith alone, without works, is necessary to justification.

SO'LO (*Ital.*), in Music, a passage, or perfect piece in which a single voice or instrument performs without accompaniment. Peculiar freedom, ease, distinctness, and power of execution, are required to perform the solo with correctness, taste, and feeling.

SOLOMON'S SEAL, the common name of a species of *Polygonatum*, belonging to the nat. ord. *Liliaceæ*. It is perennial.

SOL'STICE (*solstitium*; from *Sol*, the sun: and *sisto*, I cause to stand: *Lat.*), in Astronomy, the time when the sun is in one of the solstitial points; that is, when it is at the greatest distance from the equator, which is 23½ degrees, and when, to the people of the higher latitudes, it appears to stand still, not changing its place in the degrees of the zodiac. The solstitial points in an artificial globe are those in which the ecliptic, or path of the sun, touches the tropics.——*Summer solstice*, the 21st of June, when the sun enters the tropic of Cancer, in its progress southward, and gives the longest day. *Winter solstice*, the 21st of December, when the sun enters the tropic of Capricorn, in its progress northward, and gives the shortest day.

SOLU'TION (*solutio*, a dissolving: *Lat.*), the intimate mixture or perfect union of solid bodies with fluids, so as to form one homogeneous liquor. The word is applied both to the *act* of combination and to the *result* of the process: thus common salt disappears in water, that is, its solution takes place, and the liquid obtained is called a *solution* of salt in water.——In Algebra and Geometry, *solution* signifies the answering of a question, or the resolving of a problem.——In Surgery, the term *solution of continuity* denotes the separation of connected substances or parts applied to a fraction, laceration, &c.

SOLV'ENT (*solvens*, dissolving : *Lat.*), in Chemistry, any liquid which will dissolve substances.

SO'MATIST (*sōma*, a body : *Gr.*), one who denies the existence, and consequently the agency, of spiritual substances.

SOMATOL'OGY (*sōma*, a body ; and *logos*, a discourse : *Gr.*), the doctrine of bodies or material substances.

SOM'MITE, in Mineralogy, *nepheline ;* a mineral which occurs in small crystals. It is found on Somma and Vesuvius.

SOMNAM'BULISM (*somnium*, a dream ; and *ambulo*, I walk : *Lat.*), the phenomenon of sleep-walking, during which the sensitive and willing powers govern the muscles, while the reasoning or reflecting organs are asleep ; but in dreaming it is the contrary. The phenomena attendant on sleep-walking are very singular, the person affected performing many voluntary actions, implying a certain degree of perception of external objects. There are a number of very remarkable cases of somnambulism on record, some of which would be incredible were they not attested by unquestionable authority. Somnambulists have been known to undress and take a cold bath ; to saddle and bridle their horses, and afterwards ride to a considerable distance ; and, when their habits perhaps were more sedentary, to write letters, make verses, &c. ; while in most cases they quietly returned to their beds, and awoke at their usual hour utterly unconscious of their previous proceedings. Generally speaking, but not always, somnambulists are incapable of holding a conversation. Somnambulism may be described as a state in which the mind retains its power over the limbs, but possesses no influence over its own thoughts, and scarcely any over the body, excepting those particular members of it which are employed in walking.

SONA'TA (*Ital.*), in Music, a piece or composition wholly executed by instruments ; and generally supposed to exhibit the composer's powers without confining him within the rigid rules of counterpoint or measure.

SON'NET (*Fr.*), a short poem, which, according to its Italian model, consists of fourteen lines ; divided into two parts, the first of eight, and the latter of six lines. According to the strictest rules, only two rhymes are allowed in the first part, and the second ought not to end in a couplet ; but in our language, which possesses a comparative paucity of rhymes, the sonnet has been written with great latitude as to rhymes.

SONOM'ETER (*sonus*, a sound : *Lat.* ; and *metron*, a measure ; *Gr.*), an instrument for measuring sounds or the intervals of sounds.

SOOTH'SAYING (*soth*, truth : *Sax.*), the foretelling of future events without divine aid or authority ; and thus distinguished from *prophecy* by inspiration.

SO'PHI. [See SOFI.]

SOPH'ISM (*sophisma*, from *sophizo*, I deal subtilely : *Gr.*), a subtilty in reasoning, in which the arguments are not logically supported, or the inferences are not justly deduced from the premises.

SOPHISTICA'TION (*sophizo*, I deceive : *Gr.*), the adulterating or debasing the purity of something by a foreign admixture.

SOPH'ISTS (*sophistēs*, from *sophizo*, I deal subtilely : *Gr.*), a name at first given to philosophers and those who were remarkable for their wisdom ; it was afterwards applied to rhetoricians, and lastly to such as spent their time in verbal niceties, logical conundrums, sententious quibbles, and philosophical enigmas. The following, called the *Pseudomenos*, for example, was a famous problem amongst the ancient *sophists :* 'When a man says, *I lie*, does he *lie*, or does he *not lie?* If he lies, he speaks truth ; and if he speaks the truth, he lies.'

SOPORIF'IC (*sopor*, a heavy sleep ; and *facio*, I make : *Lat.*), in Medicine, any drug, plant, &c. that has the quality of inducing sleep.

SOPRA'NO (*Ital.*, from *sopra*, above), in Music, one of the intermediate portions of the scale, which is a species of treble, suited to the female voice.

SOR'BIC ACID, in Chemistry, acid procured from the fruit of the *Pyrus*, or *Sorbus aucuparia*, or Mountain Ash. It is identical with *malic acid*.

SORBONNE, the name of a college originally instituted for the education of secular clergymen at the university of Paris, so called after Robert of Sorbon, in Champagne, a theologian of Paris, who founded it during the reign of St. Louis, about 1250, and endowed it with an income which was subsequently much increased. This institution, the teachers in which were always doctors and professors of theology, acquired so much fame that its name was extended to the whole theological faculty of the university of Paris.

SOR'CERY (*sorcerie*, from *sors*, a lot : *Lat.*), Magic, or divination by the supposed assistance of evil spirits, or the power of commanding evil spirits.

SORD'AWALITE, a black or grayish green mineral, so named from Sordawald, in Wibourg. It is a species of hornblende and consists of alumina, iron magnesia, and a small quantity of phosphoric acid.

SOR'DES (*Lat.*), in Medicine, foul matter. Also, dregs of any kind.

SOR'EL, a term used by sportsmen for a male fallow deer of three years old.

SOR'EX (a mouse : *Lat.*), in Zoology, a genus of nocturnal insectivorous mammals, typified by the shrew mouse, which resembles the mole in the head, and the mouse in other parts.

SORGHO (*Holcus saccharatus*), a plant allied to millet, which is extensively cultivated in China, and of late years in Europe. The stem yields a juice from which sugar and spirit are obtainable, the leaves afford excellent fodder for cattle, and the seeds are suitable for feeding poultry.

SORI'TES (*sōreitēs*, from *sōros*, a heap :

Gr.), in Logic, an abridged form of stating a series of syllogisms consisting of a number of propositions so linked together that the predicate of one becomes continually the subject of the next in succession, till a conclusion is formed by bringing together the subject of the first proposition and the predicate of the last.

SOR'REL, a name given to several plants. The common sorrel is the *Rumex acetosa*, a British herb with an acid taste. The word sorrel is the *Oxalis acetosella*. The wood-sorrel is of the genus *Oxalis*. The Indian red and Indian white sorrels are of the genus *Hibiscus*. *Salt of Sorrel*, binoxalate of potash.

SO'RTES HOME'RICÆ, VIRGILIANÆ, SANCTORUM (Homeric, &c. lots: *Lat.*), a species of divination very common in antiquity. It consisted in opening a favourite author at random, and deducing an oracular meaning from the first passage which met the eye. The Greeks used Homer for this purpose, the Romans Virgil, the Christians the Bible. Some remarkable examples are on record of the applicability of the passages found to the destinies of the finders.

SORTIE' (*Fr.*), in Military language, the issuing of a body of troops from a besieged place to attack the besiegers; a *sally*.

SOSTENU'TO (sustained: *Ital.*), in Music, a term used to denote the unbroken continuance of sounds.

SOUND, in Physics, the effect produced on the ear, usually by a tremulous motion of the air, caused by the vibration of some other body which has been struck, rubbed, &c. The distance to which sounds may be heard will be proportional to the magnitude or intensity of the stroke made on the tremulous body emitting the sound; for the greater that stroke is the greater will be the agitation of its parts, and the greater will be the force with which they will strike the particles of air. Hence the greater will be the effect at any given distance on the drum of the ear; and, consequently, the greater will be the distance at which the agitation of the air will be sensible. It is ascertained that sound of all kinds travels at the rate of 1124½ feet per second, when the air is at the temperature of 32°; the softest whisper moves as fast as the loudest thunder. The knowledge of this fact has been applied to the measurement of distances. Thus, if we see a vivid flash of lightning, and in two seconds hear a clap of thunder, we may be assured that the lightning occurred at not more than the distance of 750 yards. If the vibrations of a sonorous body fall short of or exceed a certain velocity, no sound will be perceived; the smallest number which produce any effect on the ear is 32 per second; and the largest, according to some, 8200, but according to others, 24,000 per second. Taking the velocity of sound in the air as unity, its velocity in tin will be represented by 7½, in silver by 9, in copper by 12, in iron by 17, in glass by 17, in baked clay by 10 12, and in wood by 11·17. Its velocity in cast iron was found to be only 10·5. Solids are much better conductors of sound than atmospheric air; a person at one end of a long fir beam will distinctly hear a very slight tap, which is inaudible to him who makes it at the other end. Water is a very excellent conductor of sound, particularly when frozen. Sounds have been conveyed even by land to enormous distances; the cannonade of a sea fight between the English and Dutch, in 1672, was heard across England to the extent of 200 miles.——*Sound*, in Geography, any great inlet of the sea; as Plymouth sound, &c.

SOUND'ING (*sonder*, to search with a plummet: *Fr.*), in Navigation, the operation of trying the depth of the water, and the quality of the bottom, by a line with a plummet at the end.——*Soundings*, a name given to the specimen of the ground, obtained by sounding. A piece of tallow stuck upon the base of the deep-sea lead brings up distinguishing marks from the bottom, as sand, shells, &c., which adhere to it. Their nature is carefully marked in the log-book. A ship is said to be *in soundings* when she gets into water shallow enough to be sounded.

SOUTH (*suth: Sax.*), one of the cardinal points. Strictly, *south* is the horizontal point in the meridian of a place, on the right hand of a person standing with his face towards the east. But the word is applied to any point in the meridian, between the horizon and the zenith.

SOUTHCOT'TIANS, the followers of *Joanna Southcott*. She was born in Devonshire in 1750; claimed the power of prophecying, and had many followers. In her 65th year she pretended to be supernaturally pregnant. She died soon afterwards, and although it was proved that her assertion was false, the faith of many of her followers was not shaken, and they expected her to reappear.

SOUTH'ERNWOOD, the *Artemisia abrotanum* of botanists, nat. ord. *Compositæ*, a plant with sweet-scented leaves, a native of the South of Europe, common in English gardens.

SOUTH SEA BUBBLE, a term given to a commercial 'scheme,' in 1720, which, for a time, produced a kind of national delirium in England. A company for trading to the South Seas, which was entitled the 'South Sea Company,' had been sanctioned by government, with the specious pretence of discharging the national debt, by reducing all the funds into one. Blunt, the projector, had taken the hint of his plan from Law's celebrated Mississippi scheme, which, in the preceding year, had, in France, entailed ruin upon many thousand families of that kingdom. In the project of Law there was something substantial. It promised an exclusive trade to Louisiana; though the design was defeated by the frantic eagerness of the people. But the South Sea scheme was buoyed up by nothing but the folly and rapaciousness of individuals, which became so blind and extravagant, that Blunt was able to impose upon the whole nation, and make tools of the other directors, to serve his own purpose and that of a few associates. When the projector found that the South Sea stock did not rise according to his expectation he circulated a report that Gibraltar and Port Mahon would be exchanged for some places in Peru; by which means the English trade to the South Sea would be protected and enlarged. This rumour, diffused by emissaries, acted like a contagion. In five days the directors opened their books for a subscription of 1,000,000*l.* at the rate of 300*l.* for every 100*l.* capital. Persons of all ranks crowded to the house in such a manner that the first subscription exceeded 2,000,000*l.* of original stock. In a few days this stock advanced to 340*l.*; and the subscriptions were sold for double the price of the first payment. In a little time the stock reached 1000*l.*, and the whole nation was infected with the spirit of stock-jobbing to an incredible extent. The infatuation prevailed till the 8th of September, when the stock began to fall, and some of the adventurers awoke from their delirium. On the 29th of the same month the stock had sunk to 150*l.*; several eminent goldsmiths and bankers, who had lent great sums upon it, were obliged to stop payment and abscond; and the ebb of this portentous tide was so violent that it carried everything in its way, and an infinite number of families were overwhelmed with ruin. Public credit sustained a terrible shock; the nation was thrown into a ferment; and nothing was heard but the ravings of grief, disappointment, and despair. Some principal members of the ministry were deeply concerned in these fraudulent transactions; and though they used all their influence with the Bank to assist them in supporting the credit of the South Sea Company, and actually obtained from that corporation a large sum, the bubble burst; and a committee of the House of Commons, to whom the subject had been referred, declared they had discovered a train of the deepest 'villany and fraud that hell ever contrived to ruin a nation.' Suffice it to add, that some of the 'directors' were expelled the house; others taken into custody; and the estates of several confiscated by act of parliament, after a certain allowance was deducted for each, according to their conduct and circumstances.

SOV'EREIGN (*souverain: Fr.*), a supreme ruler, or one who possesses the highest authority without control. A king or queen regnant.——An English gold coin, value twenty shillings; the standard weight of which is 5 dwt. 3·27 grs., or 123·374 troy grs. One twelfth of the sovereign consists of copper, which is added to give it hardness.

SOY, a dark-coloured sauce, prepared in China and Japan from the seeds of a sort of bean. It is eaten with fish, &c. A sauce of the same name is prepared in England.

SPA, a celebrated watering-place, about seven leagues from Aix-la-Chapelle. It has been long famous for its medicinal springs, which are mentioned by Pliny, and are six or seven in number. The term is now generally applied to all mineral springs.

SPACE (*spatium: Lat.*), in the abstract, mere extension.——*Space*, in Geometry, denotes the area of any figure, or that which fills the interval or distance between the lines that terminate it.——*Space*, in Mechanics, the line which a movable body, considered as a point, is conceived to describe by its motion.——*Space*, among Printers, a slip of wood or metal for making a space between words or lines.

SPADI'CEOUS, in Botany, an epithet for a kind of aggregate flower, having a receptacle common to many florets, within a spathe, as in palms, &c.

SPA'DIX (*Gr.*; from *spas*, I pluck off), in Botany, a receptacle bearing flowers surrounded by a sheathing bract or spade. Palms have a branching spadix, arums a simple one.

SPA'HI, or **SIPAHI** (a soldier: *Ind.*), one of the Turkish cavalry.

SPAN (*Sax.*), a measure taken from the space between the end of the thumb and the tip of the little finger, when extended. The span is estimated at three hands' breadths, or nine inches.——In seamen's language, a small line or cord, the middle of which is attached to a stay.

SPAN'DRIL, the space between the curve of an arch and the right lines inclosing it.

SPAN'IEL (*espagneul: Fr.*—from its supposed Spanish origin), the *Canis familiaris avicularius*, a name given to several varieties of dog, remarkable for sagacity and obedience; the largest and most beautiful of which is the Alpine or St. Bernard's breed; and the smallest the *Canis brevipitis*, usually called king Charles's breed, used as a lap-dog.

SPAR (*Spær: Sax.*), a mass of crystallized stone; any sort of earth which breaks easily into cubical or laminated fragments with polished surfaces.——A name given to the round pieces of timber used for the yards and topmasts of ships.

SPAR'ROW, the popular name of two British birds belonging to the genus *Pyrgita* or Passer, in the family of *Fringillidæ*: the *Passer montanus* or tree sparrow, and the *P. domesticus* or common house sparrow.

SPASM (*spasmos*; from *spao*, I draw: *Gr.*), in Medicine, an involuntary contraction of the muscular fibres, or that state of the contraction of muscles which is not spontaneously disposed to alternate with relaxation; it is generally accompanied by pain. When the contractions alternate with relaxation, they are called convulsions.

SPATHE (*Gr.*), in Botany, a sheathing bract surrounding floral organs usually splitting longitudinally, as in the arum.

SPATH'IC IRON (*spathē*, a broad blade of metal, &c.: *Gr.*), a mineral of a foliated structure, and a yellowish or brownish colour.

SPAT'ULA (the *dim.* of *spatha*, a blade: *Lat.*), an apothecary's instrument for spreading plasters, &c.

SPAT'ULATE (*last*), in Botany, an epithet for a leaf shaped like a spatula or a battledore, being roundish, with a long, narrow, linear base.

SPAV'IN (*espavent: Fr.*), in the Menage, a disease in horses, being a swelling or excrescence in the inside of a horse's hough, at first like gristle, but afterwards hard and bony.

SPEAK'ER, in the parliamentary sense, an officer who acts as chairman during a sitting.——*The Speaker of the House of Commons* is a member of the house, elected, at the commencement of a parliament, by a majority of votes to act as chairman or president, in putting questions, reading bills, keeping order, and carrying into execution the resolutions of the house. The Speaker is not to deliver his sentiments upon any question; but it is his duty to interrupt a member whose language is indecorous, or who wanders from the subject of debate; he may also stop a debate, to remind the house of any standing order, or established mode of proceeding, which he sees about to be violated. He, however, submits everything to the decision of the house. If the number of votes on the two sides of the question be equal, he may decide it by his own; but otherwise he cannot vote. When the house resolves itself into a committee, the chair is filled by a temporary chairman, and the Speaker is then capable of addressing the house on any subject, like a private member. He issues warrants to the Clerk of the Crown even during the recess, to make out new writs for the election of members when seats are vacant. He receives a salary of 6000*l.* a year, and he is supplied with a furnished residence. It is customary to make him a peer when he retires. In the House of Lords, the Lord Chancellor, keeper of the Great Seal, or other person holding the King's commission, is ex-officio Speaker; he can speak and vote on any question.

SPE'CIALTY (*specialitas*, peculiarity: *Lat.*), in Law, a term applied to a contract evidenced by an instrument under seal, thereby differing from what is called *simple contract*. Specialties are, after debts of record, entitled to priority in the distribution of assets, and are not presumed to be satisfied until after twenty years; while simple contracts are extinguished by the statute of limitations in six.

SPE'CIE, in Commerce, gold or silver coin, in distinction from paper money.

SPE'CIES (*Lat.*). In Natural History, such animals or vegetables as may be presumed to have descended from the same ancestors are said to belong to the same species. Such beings are liable to vary from the influence of circumstances. Whether the variation is indefinite or restricted within certain limits is a question upon which naturalists are divided, and the solution of which is attended with much difficulty. Different races from the same parents are called *varieties*. [See GENUS.] In Logic, a predicable, which is considered as expressing the whole essence of the individuals of which it is affirmed. This essence consists of two parts, the material part or *genus*, and the destructive part or *difference*: thus, a 'quadruped' has for 'genus' *animal*, and for 'difference' the having *four legs*. Species and genus are merely relative terms: thus, a horse belongs to the species quadruped, but a quadruped belongs to the species animal. A species, when predicated of individuals, stands in the same relation to them as the genus to the species. With regard to a lower species it is a genus, while with regard to a higher it is a species.

SPECIF'IC (*species*, a peculiar sort: *Lat.*), in Medicine, a remedy which either certainly cures some particular disease or is less fallible with regard to it than other remedies.

SPECIFICA'TION (*species*, a peculiar sort; and *facio*, I make: *Lat.*), the formal description of an invention for which letters patent have been obtained, required by the law to be filed in the patent office within six months of their date, otherwise they become void.——Also, amongst builders, the statement of the work required to be done, upon which the builder's contract is founded.

SPECIFIC GRAVITY. [See GRAVITY.]

SPE'CIMEN (*Lat.*), a sample or small portion of anything; intended to exhibit the kind and quality of the whole, or of something not exhibited.

SPEC'TACLES (*specto*, I look at: *Lat.*), an optical instrument for assisting the sight. With short-sighted persons, the crystalline humour, being too convex, brings the rays to a focus before they reach the retina; concave lenses remedy this, because they make the rays to enter the eye with more divergence, and therefore to be longer without coming to a focus. With elderly persons, the crystalline humour, being too flat, does not bring the rays to a focus as soon as they have reached the retina. Convex lenses remedy this, because they make the rays to enter the eye with less divergence, and therefore cause them to come sooner to a focus. Spectacles seem to have been first used about the latter end of the 13th century. [See OPTICS.]

SPEC'TRE (*spectrum*: *Lat.*), an appearance destitute of external reality affecting a person's organs of sight when the body is in an abnormal state.

SPEC'TROSCOPE (*spectrum*, *Lat*), *scopeo*, I examine: *Gr.*), an instrument employed for the examination of the spectra of the light from the sun, planets, and fixed stars, and for the measurement of the lines and bands of shade and colour, as to breadth, distance, and position. [See SPECTRUM, and SPECTRUM ANALYSIS.]

SPE'CTRUM. If a beam of sunlight is admitted into a dark room through a hole in a shutter, and allowed to fall upon a prism of glass, the emergent beam will be decomposed, and the solar or prismatic spectrum will be seen upon the wall or any white surface placed to receive it. At the bottom is red, and to this succeed orange, yellow, green, blue, indigo, and violet, each gradually changing into the next. This experiment proves that common light is not homogeneous, but compounded of rays of various colours, which become separated by reason of their different refrangibilities. The series of colours thus produced is called the solar spectrum. By means of a suitable contrivance, the coloured rays obtained from a sunbeam may be again collected into a beam of white light. If any of the colours of the spectrum be experimented on, it will be found that it cannot be decomposed; in other words, the original beam has been divided into homogeneous rays.

SPE'CTRUM ANAL'YSIS. It has long been known that the solar spectrum [see the last article] is marked by transverse *dark* lines, of which some hundreds have been counted. When the light of a flame is transmitted through a glass prism, the spectrum produced exhibits certain *bright* transverse lines whenever certain metallic substances are burnt in the flame. Experiment showed that the same substance always produced the same kind of line and in the same part of the spectrum. The presence of the lines in the spectrum might, therefore, be regarded as a proof of the presence of the respective metals. For example, if a small quantity of common salt (chloride of sodium) be burnt, a bright yellow line appears in the spectrum in a particular position. It has been ascertained that a quantity of sodium, less than the three millionth part of a milligramme, can be easily detected in this way, and thus this is infinitely the most delicate test that can be applied to the detection of sodium. Again, if a lithium compound be projected into the flame, two sharply-defined lines at once make their appearance, one being of a weak yellow, the other of a bright red. Thus a quantity of lithium, less than the millionth part of a milligramme, may be detected by the eye. Another curious result of this new method of analysis has been the detection of new elementary substances, the existence of which had not been previously imagined. It is by means of spectrum analysis that chemists have discovered the three metals, thallium, cæsium, and rubidium.

SPECULATION (*speculor*, I watch for: *Lat.*), in Commerce, the act or practice of buying articles of merchandize, or any purchaseable commodity whatever, in expectation of a rise of price and of selling the same at a considerable advance. In this it is distinguished from regular trade, in which the profit expected is the difference between the retail and wholesale prices; or the difference of price in the place where the goods are purchased, and the place to which they are to be carried for market. *Speculation* on a large scale, upon the principle of monopolising; or that kind of speculation which consists in the purchase and sale of shares in public companies, as well as 'dabbling' in the stocks , and a variety of other hazardous transactions which might be named; are different species of gambling, and are often no less ruinous.

SPEC'ULUM (*Lat.*), in Optics, any polished body employed for the purpose of reflecting light; but it is generally understood to mean a metallic surface, one of glass being termed a *mirror*.——SPECULUM METAL, or that of which the mirrors of reflecting telescopes are made, usually consists of two parts of copper and one of tin; and its whiteness is improved by a little arsenic. ——SPECULUM, in Surgery, an instrument for dilating and keeping open a wound, in order to examine it attentively.

SPEECH (*spæcan*, to speak: *Sax.*), the faculty of expressing thoughts by words or articulate sounds. [See LANGUAGE.]

SPELL (*spel*, a story or tale: *Ang. Sax.*), any form of words supposed to possess a magical virtue. Spells have been used in all ages; and were very common among the ancients.

SPELT (*speltre: Teut.*), a species of grain of the genus *Triticum;* called also German wheat.

SPEL'TER, the commercial name of zinc; about 67,000 tons of it are used per annum, throughout the world; of which 44,000 tons are rolled in sheets.

SPERM, or SPERMACE'TI, the unctuous matter contained in the head of the *Catodon macrocephalus*, the sperm whale or blunt-headed cacholot, which lives in the warmer seas and attains the length of eighty feet. Spermaceti oil is obtained from the blubber of this whale.

SPHA'CELUS (*sphakelos: Gr.*), in Medicine and Surgery, gangrene, or mortification of the flesh of a living animal. Also, *caries* or a decay of the bone. Hence, to *sphacelate*, to mortify; and *sphacelation*, the process of becoming gangrenous.

SPHENE, a mineral substance, found amorphous and in crystals. It is composed of nearly equal parts of oxide of titanium, silica, and lime. Its colours are various, inclining either to grey, yellow, brown, or different shades of green.

SPHERE (*sphaira: Gr*), in Geometry, a solid body, such as would be formed by the revolution of a circle about its diameter, as an axis Its surface is in every part equally distant from a point called its centre. Its area is equal to the perimeter of its great circle, multiplied by its diameter; and its solid contents are equal to its surface multiplied by one-third of its radius.——SPHERE, in Astronomy, the concave orb or expanse which invests our globe, and in which the heavenly bodies appear to be fixed, at an equal distance from the eye. The ancients called the orbits of the different planets, and the space occupied by the fixed stars, *spheres*; thus, the sphere of Jupiter, the sphere of the fixed stars, &c. In the Ptolemaic astronomy, the spheres were supposed to be solid, and transparent; to revolve about a common centre, independently of one another, each carrying its planet, &c. along with it.——SPHERE, in Geography, a representation of the earth on the surface of a globe; showing the position of the equator, ecliptic, meridian, &c. When the poles are in the horizon, the ancients called it a *right sphere*; when in the zenith, a *parallel sphere;* and when in any other position, an *oblique sphere.*

SPHER'ICAL, relating to the sphere. Thus *Spherical geometry*, that branch of geometry which treats of spherical magnitudes. ——*Spherical trigonometry*, that branch of trigonometry by which we compute the sides and angles of spherical triangles.——*Spherical triangle*, a triangle formed by the mutual intersection of three great circles of the sphere. *Spherical excess*, the sum by which any three angles of any triangle on the surface of a sphere or spheroid, exceeds two right angles.

SPHER'ICS, the doctrine of the sphere, particularly of the several circles described on its surface, with the method of projecting the same on a plane; the doctrine of its properties considered as a geometrical body.

SPHEROID' (*sphaira*, a sphere; and *eidos*, form: *Gr.*), a body or figure approaching to a sphere, but not perfectly spherical. A spheroid is either *oblate* or *prolate*. The earth is found to be an *oblate spheroid*, that is, flatted at the poles; whereas an opinion had been formed by some astronomers, that it was a prolate or oblong sphere.

SPHEROSIDE'RITE (*sphaira*, a sphere; and *sidēros*, iron: *Gr.*), in Mineralogy, a substance found in the basaltic compact lava of Steinheim. It is a granular variety of spathose carbonate of iron.

SPHER'ULE (*sphærula: Lat.*), a little globe or spherical body. Thus when mercury is poured upon a plane, it divides itself into a great number of minute *spherules*.

SPHER'ULITE (same *deriv.*), in Mineralogy, a variety of obsidian or pearl-stone, found in rounded grains.

SPHINC'TER (*sphinktor*; from *sphingo*, I bind: *Gr.*), in Anatomy, the name of several muscles, whose office is to shut or close the aperture round which they are placed.

SPHIN'GIDÆ, or **SPHINGI'NA**, in Entomology, a tribe of moths of which the genus *Sphinx* is the type. To this tribe belong the humming-bird hawk-moth (*Macroglossa stellatarum*), and the death's head moth (*Acherontia atropos*). They extract the honey of flowers by means of a long proboscis whilst hovering on the wing. The larva has 16 legs, as amongst the butterflies.

SPHINX (*Gr.*), in Antiquity, an emblematical figure, composed of the head of a man or woman, and the body of a lion, to which, when it was adopted by the Greeks, wings were added. There were also sphinxes with the heads of rams (*crio-sphinxes*) and hawks (*hieraco-sphinxes*). The most celebrated sphinx is the great one near the pyramids of Geezeh, which has forelegs 50 feet long.——According to the Grecian poets, a sphinx infested the city of Thebes; and devoured its inhabitants, until a riddle proposed by it was solved. This was done by Œdipus, who slew it, whereupon the Thebans in gratitude made him their king. This riddle was as follows: 'What creature is that which goes in the morning upon four; at noon, upon two; and in the evening, upon three legs?' Œdipus answered, 'It is man; who, in his infancy, crawls upon all four, walks afterwards on two, till old age brings him to his staff, which constitutes three legs.'

SPI'CA, a star of the first magnitude in the Virgin; the α *Virginis* of astronomers.

SPI'CULA (the plural of *spiculum*, a javelin: *Lat.*), accretions of silicious or calcareous particles embedded in and supporting the soft fleshy portions of many animals of low organization. The mantles or outer coats of several shell-less molluscs contain calcareous spicula, and the bark of many flexible corals (*Gorgoniadæ*), and some stony corals (the true coral, for example) are composed entirely of these bodies. The skin of some echinoderms, especially the worm-like genera, is strengthened by calcareous spicula. The skeletons of a great number of sponges are composed of these bodies, which in one division are silicious, in another calcareous. Strictly speaking the term should be applied to the needle and pin-shaped forms, but it has been extended to every form of these bodies, hooked tri radiate, stellate, egg-shaped, wheel-shaped, &c. They are frequently very minute, and their regular forms are then pretty objects for the microscope.

SPIDERS form the order *Araneidea* in the class *arachnida*. They are distinguished from other articulata by the head being continuous with the chest and forming a part called cephalo-thorax, by the possession of falces, organs on the head which take the place of antennæ, and armed with claws perforated with a poison duct, and by the possession of four pairs of legs. The abdomen consists of one piece, and at the posterior end are situate the perforated prominences called spinnerets, through which the lines issue that form the web At the anterior end of the underside of the abdomen are placed the respiratory apertures. The eyes are simple, not compound, and are two, six, or eight in number. The sexes are distinct, the females being usually larger. Their eggs are laid in clusters, and are usually protected by some sort of nest or cocoon made of web. The young do not undergo any proper metamorphoses, but they change their integument several times before they arrive at maturity. Spiders are found in all parts of the world, the number of species being great. Some of them possess the poisonous matter in such quantity that their attack is dreaded by man.

SPIDER MONKIES are so called on account of the slenderness of their bodies and limbs. They live in trees in South America. The tail is a prehensile organ of wonderful flexibility, which is always in motion coiling and uncoiling. By this they hang from a branch, or swing themselves from tree to tree. The absence of a thumb from the hands is another remarkable part of their structure. They are mild in disposition and easily tamed. They form the genus *Ateles* of zoologists.

SPI'DERWORT, a name given to herbaceous plants of the genus *Tradescantia*, on account of the glutinous nature of their juice, which may be drawn out in long threads.

SPIKE (*spica: Lat.*), in Botany, a species of inflorescence, in which sessile flowers are placed on a simple peduncle, as in wheat, lavender, &c.——In Gunnery, *to spike a gun*, is to fill up the touchhole of a piece of ordnance, by driving a nail forcibly into it, to render it unserviceable.

SPI'KENARD (*spica nardi*, a spike of nard: *Lat.*), a plant brought from the East Indies, and therefore sometimes called *nardus Indica*. The spikenard of the ancients is supposed to have been the *Nardostachys Jatamansi*, nat. ord. *Valerianaceæ*, the root of which is, at present, much esteemed in the East as a perfume.

SPI'NAL CORD, sometimes called Spinal Marrow, in Anatomy, is that part of the nervous system which is inclosed in the spinal column of vertebrate animals. At its upper end it is in connection with that part of the human brain called the *medulla oblongata*, and is continued to the first or second lumbar vertebra, giving off in its course thirty-one pairs of nerves, each having two roots. It has been proved that sensation depends upon the posterior root, and the power of voluntary motion upon the anterior root. The spinal cord is composed of white and gray nervous matter, the white being on the outside.

SPINE (*spina*, the back bone: *Lat.*), the column of bones in the back of the vertebrate animals. [See VERTEBRÆ.]——*Spine*, in Botany, a thorn, or sharp process from the woody part of a plant. It differs from a *prickle*, which proceeds from the bark. A *spine* sometimes terminates a branch or leaf; and sometimes is axillary, growing at the angle formed by the branch or leaf with the stem. The wild apple, the sloe, &c., are armed with *spines* or *thorns*; the gooseberry-bush, the bramble, and the rose have *prickles*. Spines are branches the development of which has been arrested. Aculei or prickles are a kind of hardened hair.

SPINE'L (*spinelle: Fr.*), a subspecies of *ruby*, of different colours, red, brown, yellow, and sometimes blue; it consists chiefly of alumina and magnesia, with a colouring matter consisting sometimes of oxide of chromium, but generally of oxide of iron.

SPINELLA'NE, a dodecaëdral variety of *Zeolite*, of a blueish or brownish colour; and consisting of silica, alumina, and soda.

SPINE'T (*espinette: Fr.*), a musical stringed instrument, now no longer in use. It differed from the harpsichord in little else than size. Like that instrument, it was somewhat in the form of a harp, and was, indeed, called a *couched harp*.

SPIN'NING, in Manufactures, the act or art of uniting fibres of silk, flax, hemp, wool, hair, or other materials, into thread. It is either performed on the wheel with a distaff and spindle; or by machinery. Among the Greeks and Romans spinning was the chief employment of the women; the rites of marriage directed their attention to it; and the distaff and fleece were not only the emblems, but the objects of the most important domestic duties of a wife.

SPIN'NING JENNY, a machine invented by Hargreaves, in 1767, which enabled one person to spin from 80 to 120 threads as easily as a single thread previously. It was adapted for spinning only the softer descriptions of yarn, which were used in *weft*; being incapable of giving the firmness and hardness required in that which was used as *warp*; and it was soon superseded by the *spinning frame* of Arkwright, which could spin any number of threads, of any degree of hardness and fineness, and required only to be fed with cotton, and to have the threads joined when broken.

SPI'NOZISM, the doctrines or principles of Spinoza, a Jew of Amsterdam, born in 1634. He attempted to deduce from a few axioms, that 'there can be no substance but God; whatever is, is in God; and nothing can be conceived without God.'

SPIN'STER, in Law, the common title by which an unmarried woman without rank or distinction is designated. Curiously enough we find on the tombs of *married* women amongst the ancient Romans, the epithet 'lanifica,' spinster. King Alfred in his will called the women of his family 'the spindle side'; and Egbert, when he entailed his estates on his male descendants to the exclusion of the females, said: 'to the spear side, and not to the spindle side.'

SPI'RACLES (*spiraculum*, from *spiro*, I breathe: *Lat.*), in Entomology, the pores by which air enters the tracheæ of insects.

SPI'RAL (*speira*, anything wound round another: *Gr.*), in Geometry, a curve which winds round a centre, and in its progress continually increases its distance from that centre. The fusee or spring of a watch give a good idea of this curve. There are various kinds of spirals, which have received their names from their inventors or their properties; thus the *Spiral of Archimedes*, the *hyperbolic spiral*, &c. [See HELIX.]

SPIRE, in Architecture, a steeple that continually diminishes as it ascends, whether conically or pyramidally. The highest spire in England is that of Salisbury, 404 feet above the level of the ground, or 64 feet higher than the cross of St Paul's, and double the height of the Monument, near London bridge.——The term *spire* was used by the ancients for the base of a column, and sometimes for the astragal or torus.

SPIR'IT (*spiritus: Lat.*), in Metaphysics, an incorporeal being or intelligence.

SPIR'ITS, any inflammable liquor obtained by distillation; as brandy, rum, &c. Ordinary spirits contain from 50 to 52 per cent. of alcohol; spirits of wine, from 62 to 67 per cent.; rectified spirits, from 82 to 85 per cent. What is called *proof spirit* contains 49¼ per cent. by weight of real alcohol, and has a specific gravity at 60° Fahr. of 0·9198. When spirit is said to be any number over proof, the expression means that 100 gallons of it would take that number of gallons of water to reduce it to proof strength; thus 100 gals. of spirit 10 over proof, would require 10 gals. of water to reduce it to proof; the result of the mixture being 110 gals. at proof. [See ALCOHOL.]

SPIRITUAL COURT, one held by a Bishop or other ecclesiastic, or their representative.

SPIRIT LEVEL. [See LEVEL.]

SPIR'ITUALISM (*spiritus*, a spirit: *Lat.*), as distinguished from *Materialism*, that system which supposes everything real, to be spirit: what is called the external world being a succession of notions impressed on the mind by the Deity—which was the opinion of Berkeley; or a mere educt of the mind—which was that of Fichte.

SPLANCHNOL'OGY (*splanchnon*, the internal parts of the body; and *logos*, a discourse: *Gr.*), in Medical science, a treatise or description of the viscera; also the doctrine of diseases of the internal parts of the body.

SPLEEN (*splēn: Gr.*), in Anatomy, a soft, spongy substance, situated on the left side, between the eleventh and twelfth false ribs, and covered with a firm membrane, arising from the peritoneum. It is of an oval form, about one-fifth smaller than the liver: hollow towards the stomach, and convex towards the diaphragm and ribs; it is, however, not unfrequently irregular, and has many fissures. The use of the spleen has been much controverted; but the most probable opinion seems to be, that it serves to render more fluid the blood, out of which the bile is to be afterwards secreted; and that by this means obstructions, which must otherwise be frequent, are prevented, and the secretion of the bile promoted. In figurative language we use the word spleen for ill-humour; as, to vent one's *spleen*.

SPLENI'TIS (*Gr.;* from *splēn*, the spleen), in Medicine, inflammation of the spleen.

SPLENT (*splint*, a splinter: *Dan.*), in the Veterinary art, a callous substance or insensible swelling on the shank-bone of a horse.

SPLICE, a term in common use with seamen, &c., signifying to separate the strands of the two ends of a rope, and unite them by a particular manner of interweaving them; or to unite the end of a rope to any part of another by a like interweaving of the strands

SPLINT (*splint*, a splinter: *Dan*), in Surgery, a piece of wood or paste-board shaped so as conveniently to support a broken or debilitated limb.

SPLINTERY, in Mineralogy, that fracture of minerals which is almost even, but exhibits small splinters or scales thicker at one end than the other, and adhering by their thicker end to the broken surface.

SPOD'UMENE (*spodos*, wood ashes: *Gr*), a mineral occurring in laminated masses easily divisible into prisms with rhomboidal bases; the lateral faces shining and pearly, the cross fracture uneven and splintery. Before the blowpipe it exfoliates into little scales of an ash colour, whence its name. It consists of silica, alumina, and lithia. It is called also *triphane*.

SPON'DEE (*spondeios*, from *spondē*, a libation—at which slow, solemn melodies, chiefly in this measure, were used: *Gr.*), in the Latin and Greek prosody, a poetic foot of two long syllables.——*Spondaic Verse*, an hexameter line in which the two last feet are spondees, instead of being a dactyl and a spondee.

SPONGES, aquatic animals of such low organization that their vegetable nature has been frequently asserted. They may be roughly described as a mass of uniform animal matter (sarcode) without any visible organs, disposed upon and around a skeleton or frame-work which may be calcareous, silicious or horny and elastic, the last being the condition of the skeleton in the sponges which we employ for domestic purposes. In the great majority of the calcareous and silicious sponges the skeleton is composed of 'spicula,' that is, detached pieces shaped like needles, pins, crosses, stars, anchors, hooks, and many other forms. These are pretty objects for the microscopic observer. The external forms of sponges are very varied, cup-shaped, finger-shaped, bread-like, encrusting, &c.; and the size varies from a minute speck to the dimensions of three or four feet. Only one genus (*Spongilla*) has been found in fresh water; the rest are marine, and invariably attached to rocks, stones, or plants. They derive sustenance from the medium in which they live, which conveys their food (perhaps both minute animal and vegetable particles) into and along the canals by which they are permeated. Ciliary action has been detected in some of them, and perhaps it exists in all the species. They are propagated by ova, by gemmation, and by spontaneous division. Sponges are found fossil in the chalk, and are frequently embedded in the flints of that formation. The sponges of commerce are chiefly procured from the Mediterranean and the American coast, being brought up by divers from considerable depths. When the gelatinous matter has been removed from the fibrous skeleton it is washed and dried. The coarse kind comes from the Bahamas and Florida; the finer kinds, known as Turkey sponge, from the Mediterranean, the best being procured at the Cyclades. The divers will sometimes descend to the depth of 30 fathoms for them. About 500,000lbs. of sponge are annually imported into England.

SPON'GIOLE (*spongiolus*, literally, a little sponge: *Lat.*), in Vegetable Physiology, organs which derive their name from being composed of cellular spongy tissue. They are situated at the end of the root, and by imbibing the fluids which are in contact with them, enable plants to absorb the nourishment and moisture necessary to their growth.

SPON'SOR (a surety; from *spondeo*, I pledge myself: *Lat.*), one who binds himself to answer for another, and is responsible for his default. Hence, *sponsor*, in baptism, is a surety for the moral education of the child baptised

SPONTA'NEOUS (*spontaneus*; from *sponte*, of one's own accord: *Lat.*), an epithet for things that act by their own impulse, or without any apparent external agency; as, the spontaneous ignition of certain substances which, of themselves, will burst into a flame.

SPOON'BILL, a name given to some grallatorial birds belonging to the genus *Platalea*, of which the white species is very common in the old continent, and the roseate in the new. It is named from the shape of its bill, which is somewhat like a spoon or spatula.

SPOON'-DRIFT, a sea term for a showery sprinkling of salt water, swept from the surface in a tempest.

SPORAD'IC (*sporadikos*, scattered: *Gr.*), in Medicine, an epithet for such diseases as attack but few persons at a time; in contradistinction to *epidemic*.

SPORANGIUM (*spora*, seed; and *angeion*, a vessel: *Gr.*), the case in which the spores or ovules of the ferns, mosses, and many other cryptogamic plants is contained.

SPORES, or SPORULES (*spora*, a seed: *Gr.*), cellular bodies in the cryptogamic plants from which new plants are produced. They are equivalent to the ovules of the higher orders of plants. They have no definite points of growth, but send forth young plants from any part of their surface

SPORI'DIA (*spora*, seed: *Gr.*), spores united in definite numbers.

SPOTS, in Astronomy, dark places observed on the sun, moon, and planets. The spots on the sun vary; whilst those on the moon and planets remain the same, and by their motion make the rotation of those bodies manifest. [See SUN.]

SPOUT'ING FLUIDS. If an aperture is made in the upper surface of any pipe, and communicating with a reservoir of fluid, the latter, but for the resistance of the air, and the friction at the aperture, would spout to a height equal to that of the highest particle of fluid in the reservoir. If there is an aperture in the side of a vessel, which is full of water, the latter will spout to the greatest distance when the aperture is in the middle, and, to the same distance, from apertures which are equidistant from the middle. If there is a short pipe in the aperture, the fluid will spout from it to the greatest distance, when it is inclined to the horizon at an angle of 45°, and to the same distance, with inclinations equidistant, from 45°, for example, from inclinations of 40° and 50°.

SPRING, the season of the year when increasing solar heat restores the energy of vegetation. In the northern hemisphere, it begins when the sun enters Aries, that is, about the 21st of March; and ends at the summer solstice.——*Spring*, in Mechanics, denotes a thin piece of tempered steel, or other elastic substance; which, being wound up, serves to put several machines in motion by its elasticity: such is the spring of a clock, watch, &c.—*Spring*, in Physical Geography, a fountain of water, or issue of water from the earth, or the basin of water at the place of its issue. From *springs* proceed rivulets, and rivulets united form rivers. Rain penetrates the ground, and oozes into and through certain strata, but, being obstructed by other strata, it forms cavities and subterraneous reservoirs at various depths, many of which, when full, force their way out of the ground, and constitute springs. That reservoirs of water exist beneath the surface of the earth is manifest from what is observed in sinking Artesian wells, which see.

SPRIT'-SAIL, in Vessels, a sail attached to a yard which hangs under the bowsprit. A small boom or pole which crosses the sail of a boat diagonally, from the mast to the upper sternmost corner, is termed a *sprit*.

SPRUCE FIRS, coniferous trees belonging to the genus *Abies*. They are distinguished from pines by the cones being pendent, the carpels not being thickened at the tip, and the solitary leaves more or less two ranked. The Norway spruce (*A. excelsa*) is a lofty and valuable timber tree. The black and white spruce (*A. nigra* and *A. alba*) are Canadian trees. From the young twigs of the former spruce beer is made. The red spruce (*A. rubra*) is a native of Nova Scotia; the Hemlock spruce (*A. canadensis*) of North America.

SPRUCE-BEER, a liquor prepared by fermenting a mixture consisting of water, molasses, bruised pimento and ginger, and essence of spruce; the last being prepared by boiling the young shoots of the *Abies nigra*, and concentrating the decoction by evaporation.

SPUNK, or **TOUCHWOOD**, a name given to some fungi belonging to the genus *Polyporus*, especially *P. fomentarius*, soaked in a solution of nitre; it is used for kindling matches and tobacco, under the name of *Amadou* or *German tinder*.

SPURGE (*épurge: Fr.*; from *purgo*, I purge: *Lat.*), a name given to plants belonging to the genus *Euphorbia*.——*Spurge-laurel*, the *Daphne laureola*, a shrub.——*Spurge-olive*, the mezereon, a shrub of the genus *Daphne*.

SQUAD'RON (*escadron: Fr.*), in Military affairs, a body of cavalry usually from 100 to 200.——*Squadron of ships*, a division of a fleet, employed on a particular expedition, and commanded by a vice or rear-admiral, or a commodore.

SQUA'LUS (*Lat.*), in Ichthyology, a genus of sharks. [See SHARK.]

SQUARE, in Geometry, a quadrilateral figure, whose angles are right angles, and sides equal: that is, making its angles right angles. Also the area formed by means of a given lineal measure: as a square foot, a square yard, &c.——*Square*, in Arithmetic, the product of any number multiplied by itself. ——Among Mechanics, an instrument for squaring their work.——In Military affairs, a body of soldiers formed into a square.——*Square-root*, in Arithmetic, a number which, multiplied in itself, produces the square number: thus, 2 is the square-root of 4.——*Square-rigged*, is said of a vessel when her principal sails are extended by yards suspended by the middle, and not by stays, gaffs, booms, and lateen yards. Thus a ship and brig are square-rigged vessels.——*Square-sail*, a sail extended to a yard suspended by the middle.

SQUAR'ROUS (*squarrosus*, rough: *Lat.*), in Botany, a term applied to parts of plants which are covered with processes that spread at right angles. *A squarrous calyx* consists of scales very widely divaricating.

SQUILL (*squilla*; from *skilla: Gr.*), the name of plants belonging to the genus *Scilla*, nat. ord. Liliaceæ. From the bulbous root of some of the species a medicinal preparation is made. In large doses, squill is a purgative and emetic; in smaller, a powerful expectorant; and in combination with other remedies, a diuretic.

SQUIR'REL, the name given to small rodent mammals of the genus *Sciurus*, characterized by their lower incisors being very compressed, and the tail being long and bushy. The species are found in many parts of the world, inhabiting woods and feeding on nuts and fruits. The British species (*S. vulgaris*) lays up a store of nuts for winter, in hollow trees or in the earth. It displays great agility in leaping from branch to branch.

STA'BAT MA'TER, the commencing words of a Latin hymn, of the Roman Catholic Church, which has been repeatedly set to music by the great masters.

STACCA'TO (separated: *Ital.*), in Music, a term indicating that the notes to which it is affixed are to be detached, in a marked way, from each other. It is nearly the same as *Spiccato.*

STAC'TE (*staktē;* from *stazo,* I fall in drops: *Gr.*), a fatty, resinous, and very odoriferous kind of gum, of the nature of liquid myrrh. It is very valuable when pure; but it is supposed that we have none but what is adulterated, and that what is so called is liquid storax.

STA'DIUM (*stadion,* literally that which stands fast; a standard: *Gr.*), in Antiquity, an open oblong area, for gymnastic exercises. Vitruvius describes it as a space 125 geometrical paces long, terminated at the two extremes with two posts, called by the Romans *carcer* and *meta.* Around the *stadium* was raised a mound of earth, where the spectators were placed to see the feats of the athletæ. There were also other *stadia* covered over with colonnades and porticos, serving for the same exercises in bad weather. —— *Stadium,* an ancient Grecian measure, the extent of which is not certainly known; and which, probably, was different in different places. Eratosthenes calculated the length of a meridian to be 250,000 stadia; which, if his measurement was correct, would make a stadium to be the tenth of an English mile. Possedonius calculated the length of the meridian to be 240,000 stadia; which would give 9½ stadia to the mile.

STADT'HOLDER (*stadhouder,* city holder: *Dut.*), the title formerly given to the commander-in-chief of the forces belonging to the Republic of the United Netherlands. William IV., Prince of Orange, was constituted the first general hereditary stadtholder, in 1747; the office ceased at the French conquest; and in 1814 the head of the House of Orange was elevated to the *regal* dignity, which has been retained by his successors.

STAFF, in Military affairs, an establishment of officers in various departments, attached to the commander of an army. The staff is the medium of communication between the commander-in-chief and every department of an army.——An ensign of authority; a badge of office; as, a constable's *staff.*

STAG, the male of the deer kind.

STAG BEETLE, a common beetle in the south of England, so called from the large snagged and forked mandibles somewhat resembling the antlers of a stag. The male is sometimes nearly three inches long, and of a brownish black colour. It is the *Lacunus cervus* of entomologists.

STAGE (*stage,* a floor: *Fr.;* from *statio,* a station: *Lat.*), in the Drama, the place of action and representation; included between the pit and the scenes; and answering to the *proscenium,* or *pulpitum* of the ancients. The word *stage* also often implies the whole dramatic art in composition and performance.

STA'GYRITE, an appellation given to Aristotle from Stagira, a town in Macedonia, the place of his birth.

STALAC'TITES (*stalaktos,* dropping: *Gr.*), elongated concretions of carbonate of lime, hanging from the *roofs* of caves. It is formed by the percolation of water holding bicarbonate of lime in solution. The carbonate is left in the solid form, when the second atom of carbonic acid and the water evaporate.

STALACTIT'IC, in the form of stalactites, or pendent substances like icicles.

STALAG'MITE (*stalagmos,* a dropping: *Gr.*), concretions produced on the *floors* of caves, in the same way, and from the same cause, as *stalactites* [which see]. Sometimes the stalactites and stalagmites unite and form pillars.

STALK'ING, a term used in sporting, and applied to a kind of screen, and sometimes to a horse, to hide the sportsman while he gets within shot. Hence the word *stalking-horse* is used for a pretence.

STALL, the seat of a dignified clergyman, in a cathedral.——Also, an open shop in a market or fair.——*Stallage,* the right of erecting stalls in fairs; or rent paid for them. When they are fixed in the ground the money paid is called *pickage.*

STA'MEN (*Lat.*), in Botany, one of the bodies in a flower which secrete pollen, the fructifying principle. Whatever their number, for they vary considerably in this respect, the stamens form a whorl between the petals and the pistil. Each consists of the *filament* and the *anther,* the latter containing the fine dust called *pollen:* the filament or stalk is sometimes absent.

STAM'INIFEROUS, in Botany, an epithet for those flowers which have stamens, and usually applied to those in which the pistils are wanting.

STAMP, a mark set upon things chargeable with duty to government, as evidence that the duty is paid; as, the stamp on a newspaper, the stamp on a bond or indenture, &c.——Any instrument for making impressions on other bodies.

STAN'DARD, that which is established as a rule or model, by the authority of respectable opinions, or by general consent. Thus, Addison's writings furnish a good *standard* of pure, chaste, and elegant English composition.——In Botany, the upper petal or banner of a papilionaceous corolla.——In Commerce, the original weight, measure, or coin, committed to the keeping of a magistrate, or deposited in some public place, to regulate, adjust, and try weights used by particular persons in traffic. The standard of gold coin is 22 parts of fine gold and 2 of alloy, in the pound troy. The standard of silver is 11 oz. 2 dwts. of pure silver and 18 dwts. of alloy of copper. Whether gold or silver be above or below the standard is found by assaying, and the hydrostatical balance. The standard of measure, made by Bird in 1760, to which great authority was attached, was destroyed by the fire which consumed the two Houses of Parliament, in 1834.——STANDARD, in Military affairs, a flag or banner borne as a signal for the forming of troops into a body. ——In Ship-building, an inverted knee placed upon the deck instead of beneath it, with its vertical branch turned upward from that which lies horizontally.——STANDARDS, in Horticulture, a term used to distinguish such fruit-trees as are not trained against walls or grow in espaliers

STAN'NARIES (*stagnum*, tin: *Lat.*), the mines and works from which tin is dug and purified. Those of this country are found chiefly in Devonshire and Cornwall. ——The Court of Stannaries is a court of record of limited jurisdiction for the administration of justice amongst the tin miners of Devon and Cornwall. It is of great antiquity, and has been regulated by several acts of Parliament. The court is held at Truro, and the presiding judge is termed the Vice Warden. From his decision there is an appeal to the Lord Warden, assisted by two or more assessors, members of the judicial committee of the Privy Council, or judges of the Court of Chancery, or Courts of Common Law at Westminster.

STAN'ZA (a station: *Ital.*), in Poetry, a number of lines or verses connected with each other; being a portion of a poem containing every variation of measure in that poem. Stanzas are said to have been first used in Italian poetry.

STA'PLE (*stapel: Belg.*), a settled mart or emporium for the sale of certain articles. The king's staple, as it was called, was formerly established in certain ports of towns in England, and certain goods could not be exported, without being first brought to these places to be rated and charged with the duty imposed upon them. The principal commodities on which customs were levied were wool, skins, and leather, which being called '*staple* commodities,' the term in time was applied to the principal commodities produced by a country either for exportation or home consumption.——The word *staple* is also used to signify the thread or pile of wool, cotton, or flax; as, cotton is of a short, long, or fine *staple*.

STAR'-APPLE, a globular or olive-shaped fleshy fruit, inclosing a stone of the same shape. It is produced by a tree of the genus *Chrysophyllum*, nat. ord. *Sapotaceæ*; and is grown in the warm climates of America. It is eaten by way of dessert.

STAR'BOARD, the right hand of a ship or boat, when looking towards the head or stem; *port* being employed for the opposite side.

STAR'-CHAMBER, formerly a court of criminal jurisdiction at Westminster, so called from its roof being ornamented with gilt stars. This court took upon itself to decide upon those cases of offence with regard to which the law was silent. It passed judgment without the intervention of a jury; and differed from all other judiciary courts in this, that the latter were governed only by the common law, or immemorial custom, and acts of parliament; whereas it often admitted for law the proclamations of the king in council. This court was abolished by stat. 16 Chas. I.

STAR'-FISHES, a section of Echinodermata, one of the classes of radiate animals. They abound on all coasts, and the majority may be at once recognised by their five arms or angles, diverging from a common centre. Sir Thomas Browne long ago noticed how 'Nature among sea-stars chiefly delighteth in five points.' They may be divided into three tribes.—1. *Crinoidea*, to which the fossil Encrinites, and the living PENTACRINUS and COMATULÆ belong. 2. The *Ophiuridea*, and 3. the *Asteridea*. The animals included in these two tribes have a leathery, flexible integument, with or without calcareous plates, and a mouth which is placed at the middle of the underside. To the Ophiuridea belong those species with a discoidal body and five long arms, into which the visceral cavity does not enter; the sand-stars and brittle-stars of our coasts are examples. The Asteridea include the species with pentagonal or polygonal bodies, having the angles more or less extended in the shape of arms, which contain prolongations of the stomach; the cross fishes of our shores afford examples. The animals of both these tribes effect locomotion by means of cirri or threadlike suckers, with which the arms are furnished, and by which they pull themselves slowly along.

STARS. The members of our solar system have been treated of under the head PLANETS, and under the name of each; in the present article the fixed stars, those external to our system, will be considered. The division of the stars into constellations is only to be considered as a means of more readily referring to the more remarkable objects. This is effected by adding to the name of the constellation a letter from the Greek alphabet, as *Alpha Lyræ*, *Beta Orionis*, the name of the constellation being usually in Latin. The easiest method of acquiring a knowledge of them is to use a celestial globe, which can be compared with the heavens at the different seasons of the year. [See CONSTELLATIONS.] The stars have been usually classed according to their apparent lustre or magnitude. No more than six, or, under particularly favourable circumstances seven, magnitudes can be seen with the naked eye; but with the aid of the telescope much smaller stars can be perceived. There are about 20 stars of the first magnitude, 70 of the second, 220 of the third, 500 of the fourth, 690 of the fifth, and 1500 of the sixth. Whatever the apparent magnitudes of the stars may be, it is only by the intensity of their light, and not by any measurable diameter, that they are distinguished from one another. The higher the power of the telescope the more do they contract into minute shining points. Sir John Herschel has proposed a new method of expressing the magnitudes of the stars; namely, by determining photometrically the comparative intensities of their light. When this was done it was found that among stars of the first magnitude, some emitted only one-eighth of the light of others. It is a matter of importance to ascertain the intensity of the light of each considerable star, on account of the changes which the light of some of them undergoes. The seven stars of the Great Bear, for example, are continually changing their brightness, and they take it in turn to be one brighter than the others. Again, some stars vary periodically in light and lustre; *Algol* [which see] is one of these stars. A star in the centre of a nebula in Argus (η *Argi*) was of the fourth magnitude in 1677, but in 1844 it had become nearly as bright as Sirius. It is now gradually losing its brilliancy. It is also on record that several stars have suddenly appeared and afterwards vanished from the heavens. As to the distribution of the stars in space, it may be remarked that those of the three or four first classes seem to be pretty uniformly scattered over the heavenly vault; but looking at all magnitudes visible to the naked eye, they increase rapidly as we approach the milky way. From various observations that have been made, it seems probable that the solar system is placed near the centre of a comparatively shallow layer of stars, and that we look in the direction of its top and bottom when we cast our eyes on the heaven on each side of the Milky Way, and in the direction of its sides or edges when we look upon that luminous band. [See GALAXY.] The total number of stars must be considered infinite. Sir W Herschel counted 238,000 stars in the field of his 20 feet reflector in 41 minutes of time, and it is probable that the more powerful telescopes constructed since his day render 100 millions visible. In many clusters whose area does not exceed the tenth part of that covered by the moon, from ten to twenty thousand stars have been counted With regard to the distance of the stars, the only mode by which the interval which separates them from us can be calculated is by ascertaining their parallax [see PARALLAX], for which the best instruments and the most careful observations are needed The largest amount of parallax yet discovered is that of α *Centauri*, but this does not amount to one second; that of *Sirius*, which emits four times the light of α *Centauri*, is less than the sixth of a second; whilst that of *Capella* is only about the 22nd of a second. It must be concluded that the stars are suns shining by their own light, for since they are destitute of measurable discs, the light they emit cannot be reflected. Assuming the parallax of Sirius to have been correctly ascertained, it has been calculated that his intrinsic splendour is more than 224 times that of our sun. It was long believed that the appearance of double stars, and even of three or more, which seem to form systems, was due to their being situated in the same line of view; and in some instances, this may be the case. But it is now ascertained beyond a doubt that there exist sidereal systems, composed of two, three, four, and even five stars, revolving round each other, or round a common centre. In addition to such motions it has been discovered that some stars have a proper motion, that is, they are carried bodily away from their places along unknown paths. This motion is small, but it has been distinctly made out. Thus 61 *Cygni* has moved 4m. 23s. during the last 50 years [See GALAXY, NEBULÆ, MAGELLANIC CLOUDS.]

STAR′ STONE, a rare variety of *sapphire*, which, when cut and viewed in a direction perpendicular to the axis, reflects light in the form of a star.

STAR′-WORT, a plant of the genus *Aster*. The *yellow star-wort* is of the genus *Inula*.

STARCH (*stärke: Ger.*), one of the most common vegetable principles; but, in Commerce, the name is restricted to that obtained from wheat. In manufacturing wheaten starch the grain is ground, and the meal is diffused through water, where it undergoes a slight fermentation and acquires a peculiar sour smell: the gluten and albumen partially separate in the form of a viscid scum, and the starch which subsides as a fine white powder is washed, allowed to settle, drained, cut into squares, and dried Starch may be obtained from potatoes, by rasping them, carefully diffusing through water, agitating and decanting, allowing the starch to settle, washing, draining, and drying. The blueness of commercial starch arises from the addition of a little *smalt* Starch forms a gelatinous compound with water heated to 175°, and the solution, though greatly diluted, is rendered blue by iodine, which is the test of starch.——*Arrow root* is the starch of the *Maranta arundinacea*; *sago*, that of the *Sagus fariniferus*, an East Indian palmtree and other trees; *tapioca* and *cassava*, that of the *Jatropha manihot*. The different varieties of starch appear, under the microscope, as rounded or oval grains, which consist of little sacs containing the starchy matter. They exhibit a beautiful play of colours in the polariscope. Cold water has no effect upon these sacs, but hot water swells them and causes them to burst, whereupon they are converted into a gelatinous mass In the process of germination and by means of chemical agents, starch may be changed into *dextrine*, a gum-like body; and also into a species of sugar.

STAT′ICS (*statikos*, belonging to a state of rest; from *istēmi*, I stand: *Gr.*), the doctrine of the *Equilibrium of forces*, that branch of Physics which treats of bodies *at rest*. Dynamics treats of bodies *in motion*. *Equilibrium* may be produced in three ways. 1. By two equal and opposite momenta [see MOMENTUM], as with the lever. 2. By *composition of forces* [which see], as when a body is acted on by any number of forces, represented in quantity and direction by *all* the sides of any rectilineal figure taken in succession. 3. By the principle of *virtual velocities* [which see]; that is, when the forces which act on a body are in the inverse ratio of the respective spaces which the points at which they act would describe, were the equilibrium from any cause slightly disturbed.

STA′TIONARY (*stationarius*, pertaining to a fixed station: *Lat.*), in Astronomy, an epithet applied to the appearance of a planet, when it seems to remain on the same point of the zodiac for several days. As the earth, from whence we behold the motions of the planets, is out of the centres of their orbits, the planets appear to proceed irregularly; being sometimes seen to go forwards, that is, from west to east; and sometimes backwards, or from east to west, which is called their *retrograde* motion. Now between these two states there must be an intermediate one, in which the planet neither appears to go backwards nor forwards, but to stand still. [See PLANET.]

STATIONARY ENGINE. A fixed steam engine such as is used on a railway, for drawing a train up an inclined plane, by means of a rope. The word is used in opposition to *Locomotive*.

STATIS'TICS (*status*, condition: *Lat.*), a science which exhibits the conditions of a country, with regard to its extent, population, industry, wealth, and power. It includes the natural and acquired capabilities of productions; the quantity and value of the various articles of utility and convenience which it possesses, and annually produces; the number and classes of its inhabitants, with their respective incomes; with the institutions for the government, improvement, defence, and maintenance of the population. It has much in common with *geography* and *politics*, and includes what is termed political arithmetic. The accounts and details given, to be of any value, must be accurately drawn up; and the circumstances to which they are due must be clearly explained. In a work on statistics ought to be included the condition of the poor; the state of schools and other public institutions of utility; with every other subject, the knowledge of which may be useful in ascertaining the moral condition and political strength of a country, its commerce, arts, &c.

STA'TUS QUO (the state in which: *Lat.*), that condition between two or more belligerents, who have entered into a treaty by which they are restored to the same state as before the war, with regard to their territories, fortresses, &c.

STA'TUTES (*statut: Fr.:* from *statuo*, I decide: *Lat.*), acts of parliament made by the three estates of the realm, and which are either public or private. *Statutes* are distinguished from *Common law*. The latter owes the obligation it imposes to the principles of justice, to long use, and the consent of a nation. The former owe their binding force to a positive command or declaration of the supreme power. The courts of Westminster must take cognizance of the public statutes without their being specially pleaded, but not so of private statutes.

STAU'ROLITE (*stauros*, a cross; and *lithos*, a stone: *Gr.*), in Mineralogy, the *cross* stone or *Harmotome*. It is a silicate of baryta and alumina, with traces of lime and potash; and consists of small quadrangular prisms, crossing each other.

STAU'ROTIDE (*stauros*, a cross; and *eidos*, form: *Gr.*), in Mineralogy, the *Prismatic garnet*, or *grenatite* It is a silicate of alumina and lime, with the oxides of iron and manganese, and consists of four and six-sided prisms, crossing each other, at right angles. It occurs in primary rocks; and is distinguished from *garnet* by its form and the difficulty of fusing it.

STAVE, or **STAFF** (*stale: Germ.*), in Music, the five horizontal and parallel lines, on which the notes of tunes are written or printed.——A thin narrow piece of timber, of which casks are made.

STAY, in the rigging of a ship, a large strong rope employed to prevent the mast from falling aft. It reaches from the masthead forward towards the bow; and takes its name from that of the mast, as the *forestay*, *maintopmast-stay*, &c.——To *stay* means to *tack;* to be *in stays* is to be *in the act of tacking;* to *miss stays* is to *fail in tacking.*——STAY-SAIL, any sail extended on a stay.——STAY-TACKLE, a large tackle attached to the main-stay by means of a pendant, and used to hoist heavy bodies.

STEAM, water converted into a gaseous state by means of heat. When produced under the common atmospheric pressure, the elasticity of steam is equal to the pressure of the atmosphere. If the pressure under which it is generated does not exceed that of the atmosphere by more than about five pounds, it is called *low pressure* steam; otherwise it is *high pressure* steam. It has been ascertained that the quantity of heat required to convert a given quantity of water into steam is 5½ times greater than that required to raise it from the freezing to the boiling point; and hence, if the water were not evaporated, its temperature would be raised 990° above 212°; but a fluid exposed in an open vessel to the action of fire, however great the heat applied, cannot be made to indicate a higher temperature than that at the boiling point. Steam will be evolved in greater or less quantities, according to the quantity of heat applied; but the temperature will continue at exactly the boiling point. When water, exposed to the pressure of the atmosphere, is heated to the temperature of 212°, globules of steam are formed at the bottom of the vessel, and rising through the fluid may be collected at its surface. Steam is transparent, and consequently invisible; but when it has been deprived of a part of its heat, by coming in contact with cold air, it condenses and becomes water, in the form of very minute particles, which float in the air, and form a cloud. If the pressure on the fluid be increased by closing the vessel, its temperature must become higher before the elasticity of the vapour which is generated will be able to overcome the increased pressure, so as to rise from the fluid. If the pressure is increased to the amount of an additional atmosphere, that is, by about 14lbs., it will be found that the temperature of the fluid will have risen to 250° before any vapour will be given off; and these variously increased pressures will require corresponding augmentations of temperature. But increasing the temperature and elasticity of the steam does not in the least increase its mechanical effect. A cubic inch of water, changed into steam, at 212°, will occupy 1700 cubic inches. If, however, the steam is produced under a pressure of *two* atmospheres, the cubic inch of water will form only *half* as much steam, or 850 cubic inches; if under a pressure of *three* atmospheres, only *one-third* as much steam, or 561 cubic inches; and so on. The mechanical effect producible by a given quantity of water is in all cases the same; for, let us suppose the steam generated from a cubic inch of that fluid, under the ordinary atmospheric pressure, to move a counterpoised piston, that is, one practically without weight, twelve inches, the atmospheric pressure has been overcome through that distance; that is, a force of about 2080lbs. has been exerted through a space of twelve inches. But, let the cubic inch of water be changed into steam, under the pressure of two atmospheres, the piston will now be raised through only six inches; but besides overcoming the force of the atmosphere to the amount of 2080lbs. through that distance, it will also be able to raise 2080lbs.; that is, the steam in this case will move twice 2080lbs, or 4160lbs through six inches; and, according to the ordinary mechanical laws, 2080lbs. moved through twelve inches is identical in mechanical effect with 4160lbs. moved through six inches. [See MOMENTUM.] Again, let the steam from one cubic inch of water be generated under the pressure of *three* atmospheres, the piston will now be raised through only four inches; but it will be moved with a force of three times 2080lbs. or 6240lbs. but 2080lbs. moved through twelve inches, 4160lbs. moved through six inches, and 6240lbs. moved through four inches, are all equal in effect, because they produce equal momenta. Thus, just so much as we increase the pressure under which the steam is generated we increase its elasticity; but, to the same extent, we diminish the space through which it acts. And we make no alteration in the quantity of fuel consumed; for the quantity of heat communicated to the given quantity of water is the same in all cases. Hence, so far as consumption of fuel is concerned, it is a matter of indifference whether we use a high or a low pressure engine; the former occupies less space, but there is a greater waste, from the greater tendency of high pressure steam to leak, and from the increased radiation of heat, at the higher temperature. The very important facts just enumerated may be easily proved. Let a given quantity of water be changed into steam, at any pressure; five and a half times as much water, at 32°, will exactly condense it, and with the condensed steam will form six and a half times as much water at 212°. If the steam is at 212°, the temperature undergoes no change; and the ice-cold water, which will have been raised, during condensation, to 212°, will owe its elevated temperature entirely to the heat which was *latent* in the steam. It is worth remarking that, while the steam from a tea kettle will scald the hand, if held within it, that which escapes from a high pressure boiler will feel cool. This, however, is easily explained, by the fact that the steam expands when it is relieved from pressure, and the greater its elasticity the greater will be its expansion, in reality it expands to a bulk greater than it would have occupied had it been generated at a temperature of 212°, just as a spring, when drawn out of its natural position, will, on being released, not only regain its former shape, but will vibrate in the opposite direction.

STEAM BOILER, a vessel used to generate steam for the supply of a steam engine, &c. The common *tea kettle* exemplifies the simplest form of boiler; when it is used, no economy of fuel is attempted, and the heat is applied without any reference to the production of its maximum effect; cold air circulates round the kettle, and retards the heating of the water, and much heat from the fire escapes into the apartment. A better application of heat is shown in the *boiler of a laundry;* both boiler and fire are enclosed in a non conducting material; the heated air circulates more or less round the fluid, and the intensity of the fire is increased by the air which supports combustion being made to pass through the fuel, and with considerable velocity, as no other air is allowed to pass into the chimney. The old *waggon steam boiler* may be considered as the next stage of improvement; with it the smoke and heated air, in passing from the fuel to the chimney, circulated round the water to be heated, since it passed round the outer sides of the boiler. This form of boiler was, however, from its shape, extremely weak; it was applicable, with any degree of safety, to the production of only very low pressure steam; and it has been superseded by the cylindrical boiler with hemispherical heads, set in such a way as that the smoke and heated air pass round it before reaching the flue. The next step in improvement consisted in the adoption of a cylindrical boiler, having within it a smaller cylinder of equal length, through which the smoke and heated air, after circulating round the outside, passed to the chimney. The inner cylinder is placed near the bottom of the outer, that the heated air, &c. within it may not only pass through the water and be always covered by it, but may be immersed in the coldest part of that fluid which, on account of its greater density, is always found in the lowest place. The furnace is very generally situated within one end of the inner cylinder; and thus the burning fuel is surrounded on all sides by the water to be heated The heating surface is increased, and the heated gases passing to the chimney are still more effectually deprived of their heat, before escaping, by the use of two inner cylinders, instead of one; by using a number of comparatively large tubes instead of the inner cylinder—as in the marine boiler; by using a number of small tubes—as in locomotives for railways, &c. Since it is impossible to generate exactly the required amount of steam, the means of liberating any extra quantity must be provided, or the boiler will almost certainly explode; this is effected by the use of a *safety valve.* It is of a conical form, ground steam tight into a conical seat, and is loaded with a weight, depending on the number of square inches in its surface, and on the steam pressure which is required When the steam within the boiler exceeds this pressure it lifts the safety valve and escapes. Without a safety valve safety is out of the question; with a safety valve there is still danger, unless it is occasionally examined; for the valve may *adhere to its seat,* in which case the force necessary to lift it may require a steam pressure far exceeding what the boiler is able to bear. The boiler must be regularly supplied with *water* if it is inadvertently nearly or quite filled, the machinery may be injured by the introduction of water into the cylinder, or there may even be an explosion. If the supply of water is insufficient, and this is by far the most usual case, the fire or highly heated air will reach beyond the water, the boiler will then be *burned*, and therefore greatly weakened, so as not to retain strength enough to resist the ordinary pressure; or, water being thrown by the pump over the highly heated metal, a vast quantity of steam may be suddenly generated, and an explosion may occur. Two methods are used for supplying a boiler with water; one that is self-acting, and therefore the best, which consists in a cistern being placed so high above the boiler that the pressure of a column of water reaching from it to the boiler may overcome the pressure of the steam so that water may enter, when the fall of a *float* within opens a valve. But this contrivance can be used only with fixed engines, and when the low pressure steam is used; for a pressure of 15lbs. per square inch above the ordinary pressure of the atmosphere would require a column of water of about 35 feet to overcome it; a pressure of 30lbs. above that of the atmosphere would require a column of about 70 feet; but steam of from 50lbs. to 100lbs. pressure above that of the atmosphere is being often used.—*Effective pressure* is that part of the pressure which exceeds the atmospheric; it is that which is not counteracted by the pressure of the air. Steam of only about 14¾lbs. pressure to the square inch would not escape, even from an aperture in the boiler; it would be kept in by the pressure of the atmosphere; so that when steam is said to have a pressure of 15lbs. to the square inch it really has a pressure of near 30lbs., but its effective pressure is only about 15lbs., the remaining 15lbs. being neutralized by the pressure of the atmosphere. The more usual, indeed the almost universal, mode of supplying the boiler with water is by means of a *force-pump;* when water is not required, the pump is either not allowed to work, or its feed-pipe is closed by a cock—in which case the plunger works in vacuo. We must at all times be able, as it were, to look within the boiler, that we may be certain the quantity of water is neither too great nor too little. Various contrivances enable us practically to attain this object.—*Gauge-cocks* are so placed that when the boiler is properly supplied one of them, on being opened, emits water, and another steam; there is too much water if it issues from both cocks, and too little if it issues from neither. A *float*, also, is often fixed within the boiler; it is connected with a steam whistle, which sounds when the surface of the water and the float sink too low; or with a brass rod, which, passing steam-tight through a small stuffing box fixed in the top of the boiler, shows by the amount of the rod exposed to view what is the depth of water inside; the higher the surface of the water the more the rod will, of course, project. When the stuffing is not unnecessarily tightened on the rod, and the latter is kept smooth and clean, its indications will be very satisfactory. Another contrivance consists in a *glass tube*, so fixed vertically, at one end of the boiler, that the proper water level is at about half its height; and as its upper and lower ends open into the boiler, if neither is allowed to be obstructed the water will stand in it and within the boiler at the same height, and thus the water level within may be known, at any moment, by merely inspecting the tube. The matter is so important, that no *one* of these contrivances should, if possible, be relied on, and certainly no number of them, without constantly examining if they are in proper working order. All boilers, but especially marine boilers, are liable to incrustations from the substances which are generally contained in water, and are left behind when it is evaporated. These incrustations consist of substances which are bad conductors of heat, and which, therefore, not only keep the water from being heated, but allow the metal under them to have its temperature unduly raised, and therefore to be *burned.* If they happen, which is very likely, to crack from the high temperature, water rushes through the fissure; and this coming in contact with the highly-heated metal, so much steam may be suddenly generated as will cause explosion. These incrustations must, therefore, be avoided as far as possible, and, when at all considerable, must be removed; they are best prevented by frequently blowing off that part of the fluid which is most highly charged with saline substances, and which, being the heaviest, is found at the lower part of the boiler. *Hall's condenser* was proposed as a means of condensing the steam without mixture with the condensing water, that the same fluid might be used continually in the boiler, and thus incrustations be prevented; it consisted of a very extended series of pipes immersed in cold water; the principle was tried by Watt and abandoned by him, as it did not condense with sufficient rapidity, and a kind of fur collected in the pipes, which, unless frequently removed, prevented the heat of the steam from passing to the water outside. Marine boilers are rapidly corroded by the salt water which is, of necessity, used, and therefore do not last long. To secure the best effect from a boiler, the fuel should be supplied in moderate quantities at a time.

STEAM CAR'RIAGE. This name is usually applied to a locomotive which is intended for ordinary roads. Many and costly experiments have been made on this subject; but they have, as yet, produced but little result. The force required to draw a carriage on a common road is very different from that which would be sufficient on a railway; the roughness, small stones, ruts, &c., present most serious impediments, and, by the shaking they produce, greatly increase the wear and tear of a machinery, which is of necessity extremely ponderous, and extremely liable to be deranged.

STEAM-ENGINE, a machine intended for the production of motive power by means of the evaporation of water. Attempts to derive force from steam are noticed very early in the History of Science.——Hero, of Alexandria, about a century before Christ, described a contrivance, in which tubular arms, placed at right angles to an axis, were made to revolve, by the escape of steam from apertures situated at their opposite sides and ends. This, which is a most wasteful application of steam, has been re-invented at various times, and in different forms, by persons not aware of its having been previously tried, nor of the objections to which it is liable. The steam imparts motion to it on the same principle as the water to that form of turbine, known as *Barker's Mill.* [See TURBINE.] In the 17th century Branca, an Italian engineer, proposed to move a wheel by steam, blown tangentially against it. Solomon de Caus, a French engineer, raised water into a chamber, placed over a well, and communicating with it by a pipe, by filling the chamber with steam, and then condensing it; the pressure of the atmosphere on the surface of the water in the well forced it up to supply the vacuum in the chamber. With this arrangement, great quantities of steam were wasted by condensation, as long as the surface of the chamber remained cold, each time that it was filled with water, and emptied. The water was elevated from the well, not by the power of steam but by the pressure of the atmosphere; the steam being employed only to form a vacuum. The Marquis of Worcester, in his 'Century of Inventions,' describes a machine in which steam was made to raise water by pressure on its surface; but, in this case also, steam was wasted, being condensed by the cold surface of the fluid and that of the reservoir containing it. Papus proposed to generate steam in a cylinder, and, by condensing it, to move a piston, but the steam was to be generated in the cylinder itself by the application of a fire; and, therefore, the contrivance was attended with serious inconvenience. Savary, an Englishman, in 1698, patented an apparatus for lifting water by means of a vacuum produced by steam, and elevating it still higher by the pressure of steam on its surface: thus combining the methods used by De Caus and the Marquis of Worcester; and this mode of applying steam was used to a considerable extent. The next essential improvement was made by Newcomen, for which he obtained a patent in 1705. It consisted in separating the parts of the engine in which the steam was to act from those in which the water was to be raised; the weight of the atmosphere being employed for the purpose of pressure, and the steam for that of first displacing the air, and then forming a vacuum by condensation. Newcomen was thus enabled to dispense with the use of steam of great and dangerous elasticity; he worked with moderate heats, and removed at least some part of the causes of wasteful and ineffectual condensation. To him we are indebted for the introduction of the steam *cylinder* and *piston*, and for their connection with the pump by means of the main lever or *beam*, with its rods and chains: to which we might add several subordinate contrivances, which do great credit to his ingenuity. Still, however, the machine required the constant attendance of some one to open and shut the cocks at the proper intervals, for the alternate admission of steam and cold water. But a boy who was in charge of one of these engines perceived that he might cause the engine to move its own valves by connecting the cocks to the working beam. Having done this by means of strings, he left the engine to itself, and went to play. From this time to the year 1764 there seems to have been no material change in the structure of the engine, which still continued to be known by the appellation of Newcomen's, or the atmospheric engine. The boilers, however, had been removed from under the cylinder in some of the larger engines, and the cylinder had been fixed down to a solid basis. Still the steam was condensed in the cylinder; the hot water was expelled by the steam, the piston was pressed down by the weight of the atmosphere, and kept tight by being covered with water. It was moreover considered necessary that the injection cistern should be placed on high, in order that the water might enter with great force. It had been found by experience that the engine could not be loaded, with advantage, with more than seven pounds on each square inch of the piston, and the inferiority of that power to the known pressure of the atmosphere was, without due consideration, imputed wholly to friction. The bulk of water, when converted into steam, was very erroneously computed; the quantity of fuel necessary to evaporate a given quantity of water was not even guessed at; whether the heat of steam is accurately measured by its temperature was unknown; and no good experiment had been made to determine the quantity of ejection water necessary for a cylinder of given dimensions. Such was the state of matters, when, fortunately for science and the arts, Watt, then a mathematical instrument maker at Glasgow, undertook to repair the model of a steam-engine belonging to the university. In the course of his experiments with it he found the quantity of fuel and injection water it required much greater in proportion than they were said to be in large engines; and it soon occurred to him that this must be owing to the cylinder of this small model exposing a greater surface, in proportion to its contents, than larger cylinders did. This he endeavoured to remedy, by making his cylinders and pistons of substances which conducted heat slowly. He employed wood prepared on purpose, and resorted to other expedients without producing the desired effect in any remarkable degree. He found also, that all attempts to produce a greater degree of exhaustion, or a more perfect vacuum, occasioned a disproportionate expenditure of steam. In reflecting upon the causes of these phenomena, the recent discovery, that water boiled in an exhausted receiver at low degrees of heat (certainly not exceeding 100° of Fahrenheit, but pro bably, when the vacuum was perfect, much lower), occurred to him, and he immediately concluded that, to obtain any considerable degree of exhaustion, the cylinder and its contents must be cooled down to 100° at least; in which case, the reproduction of steam in the same cylinder must be accompanied with a great expense of heat, and consequently of fuel. He next endeavoured to ascertain the temperature at which water boils, when placed under various pressures; and not having any apparatus at hand by which he could make his experiments under a pressure less than that of the atmosphere, he began by trying the temperature of water boiling under great pressures; and by laying down a curve, of which the *abscissæ* represented the temperatures, and the *ordinates* the pressures, he found the law by which the two are connected, whether the pressure be increased or diminished. By a very simple experiment with a Florence flask, he ascertained that water, when converted into steam under the ordinary pressure of the atmosphere, occupies about eighteen hundred times its original space. These points being determined, he constructed a boiler in such a manner as to show by inspection, with tolerable accuracy, the quantity of water evaporated in any given time; and he also ascertained, by experiment, the quantity of coals necessary to evaporate a given quantity of water. He now applied his boiler to the working model before mentioned; when it appeared, that the quantity of steam expended at every stroke exceeded many times what was sufficient to fill the cylinder; and deducing from thence the quantity of water required to form as much steam as would supply each stroke of the engine, he proceeded to examine how much cold water was used for injection, and what heat it gained; which, to his very great surprise, he found to be many times the number of degrees which could have been communicated to it by a quantity of boiling water equal to that of which the steam was composed. Suspecting, however, that there might be some fallacy in these deductions, he made a direct experiment to ascertain the degree of heat communicated by steam to water; when it clearly appeared, that one part of water, in the form of steam, at 212°, had communicated about 140° of heat to six parts of water. The causes of the defects of Newcomen's engines were now evident. It appeared that the steam could not be condensed so as to form an approximation to a vacuum, unless the cylinder, and the water it contained, were cooled down to less than 100°; and that, at greater degrees of heat, the water in the cylinder must produce steam, which would in part resist the pressure of the atmosphere. On the other hand, when greater degrees of exhaustion were attempted, the quantities of injection water required to be increased in a very great ratio; and this was followed by a proportionate destruction of steam on refilling the cylinder. Watt now perceived, that to make an engine in which the destruction of steam should be the least possible, and the vacuum the most perfect, it was necessary that the cylinder should condense no steam on filling it; and that, when condensed, the water, forming the steam, should be cooled down to 100°, or lower. In reflecting on this desideratum, he was not long in finding that the cylinder must be preserved always as hot as the steam which enters it; and that, by opening a communication between this hot cylinder when filled with steam, and another vessel exhausted of air, the steam, being an elastic fluid, would rush into it, until an equilibrium was established between the two vessels; and that if cold water, in sufficient quantity, were ejected into the second vessel, all the steam it contained would be reduced to water, and no more steam would enter until the whole was condensed. But a difficulty arose—how was this condensed steam and water to be got out of the second vessel without letting in the air? Two methods presented themselves. One was, to join to this second vessel, which he called the *condenser*, a pipe, which should extend downwards more than 34 feet perpendicular, so that the column of water contained in it, exceeding the weight of the atmosphere, would run out by its own gravity, and leave the condenser in a state of exhaustion, except in so far as the air, which might enter with the steam and injection water, should tend to render the exhaustion less perfect: and to extract the air by means of a pump. The second method was to extract both air and water by means of a pump or pumps; which would possess the advantage over the other of being applicable in all situations. This latter contrivance was therefore preferred; and is known by the common name of the *air pump*. There still remained some defects in Newcomen's cylinder. The piston was kept tight by water; much of which passing by the sides, injured the vacuum below by its evaporation; and this water, as well as the atmosphere which came into contact with the upper part of the piston and sides of the cylinder at every stroke, tended materially to cool that vessel. Watt removed these defects, by applying oils, wax, and fat of animals to lubricate his piston and keep it tight; he put a cover on his cylinder, with a hole in it, made air and steam-tight, for the piston-rod to pass through, and employed the elastic force of steam to press upon the piston; he also surrounded the cylinder with a case of wood, or of other non-conducting substance, which, containing steam, should keep it always of an equable temperature. In 1765, Watt executed a working model, the effect of which he found fully to answer his expectations; and the improvement of Newcomen's engine, so far as the saving of steam and fuel was concerned, was now complete In short, the principle of keeping the vessel in which the elasticity of the steam is exerted always hot, and that in which the condensation is performed always cold, is in itself perfect. For, the steam never coming in contact with any substance colder than itself until it has done its office, no part is condensed until the whole effect has been obtained in the cylinder; and when it has acted there, it is so condensed in the separate vessel that no resistance remains; accordingly, the barometer indicates a vacuum, nearly as perfect as by the exhaustion of the air-pump. In 1784, Watt obtained a patent for the *parallel motion*, which was devised for the purpose of causing the piston rod to move always parallel to itself. With Watt's *single acting* engines, in which the piston was raised by a counterpoise, and depressed by condensation of the steam beneath it, an *arched* head attached to the end of the working beam, and connected by a chain with the upper end of the piston rod, was sufficient to maintain the latter in an upright position. But with his *double acting* engine, in which the piston was raised by steam under it and a vacuum over it, and depressed by steam over it and a vacuum under it, a flexible connection between the piston rod and working beam was inadmissible; while, on the other hand, they could not be *directly* connected, as the piston rod must work steam-tight through a packing box in the corner of the cylinder, and could not accommodate itself to the curved direction followed by the end of the beam. He, at the same time, invented several other useful contrivances; and in the year following, produced his *smoke consuming* furnace, *steam gauge*, *condenser gauge*, *indicator*, *governor*, &c. Many important modifications of the steam engine have been contrived since that period, and it has been gradually brought to the extraordinary perfection which it has now reached. The principle of this wonderful machine is very simple. It is, in fact, only a pump, in which the fluid is made to impel the piston, instead of being impelled by it; that is to say, in which the fluid acts as the *power*, instead of being the *resistance*. It may be described simply as a strong barrel or cylinder, in which is a closely-fitting piston, which is driven up and down by steam admitted alternately above and below from a suitable boiler; while the end of the piston-rod, at which the whole force may be considered as concentrated, is connected in any convenient way with the work that is to be performed. The power of the engine is of course proportioned to the size or area of the piston, and the force with which the steam acts. In some of the Cornish mines there are cylinders and pistons of more than ninety inches in diameter, on which the pressure of the steam equals the efforts of 600 horses; and engines constructed for many of the enormous vessels which are used at present are of even greater power. Engines are usually divided into *high* and *low* pressure, or more accurately, into *condensing* and *non-condensing*. With a condensing engine, as we have seen, the steam is condensed, by which means not only the *effective* but the total steam pressure [see BOILER] is rendered available; that is, theoretically there is a gain of about 15lbs. to the square inch, which with a non condensing engine is consumed in forcing the steam from the cylinder, in opposition to the pressure of the atmosphere; so that, in point of fact, a condensing engine would work with steam having a pressure less than that of the atmosphere; in which case the boiler would have a tendency rather to *collapse* from external than to *explode* from internal pressure. This a great economy of power; but serious deductions must be made on account of the more or less imperfect condensation, the force expended in working the air pump, and the pump connected with the condenser, &c. Besides, the non-condensing engine is so simple, so convenient, and so easily applied in almost any circumstances, that its use has become very general, and it is employed exclusively on railways. It occupies less room, requires less fuel, than a condensing engine. What appears to be, and is often considered but one engine, may really consist of two—thus a locomotive engine. Whenever it is impossible to use a flywheel, to carry the cranks over the dead points, or to render the power uniform, as on railways and in steam-vessels, two engines are so combined that when one produces its maximum the other produces its minimum effect, and the combined effect of both is practically a constant quantity; which is accomplished by fixing the cranks at right angles, on the same *axle* or *shaft*. Another very effective means of saving power consists in using the steam *expansively*, that is, cutting it off before the piston has reached the end of the cylinder, and allowing the expansion of the steam, which is retained within the cylinder, to finish the stroke; all the effect produced, after the steam is cut off, is evidently so much power gained. To illustrate this, let us suppose the pressure to be 60lbs. the square inch, the cylinder to be two feet long, and the steam to be cut off at half stroke. When the steam begins to expand in the cylinder it has a pressure of 60lbs.; when the piston has finished the stroke, the same steam, having now filled the cylinder, occupies double the space; its pressure is therefore only one-half, or 30lbs., and its average pressure, while the piston was traversing the last half of the cylinder, was $\frac{60 + 30}{2}$, or 45lbs.; hence the work done before the steam was cut off was to the work done after it was cut off, and therefore by the mere expansion of the steam, as 60 to 45, that is, as 4 to 3. It would be found that the sooner the steam is cut off the more power is gained by expansion; but if it is cut off too soon there will be an inconvenient difference in the pressures, at different parts of the stroke, and therefore the power of the engine will be subjected to too great variations. To describe the various applications of steam power would far exceed our limits; but, if we except its adaptation to the motion of carriages, perhaps few of its effects are more astounding than those perceived in the manufacture of iron. Here its resistless power is seen, when with mechanic claws it seizes masses of iron, and in a few minutes delivers them out again pressed into thin sheets, or cut into bars and ribbons, as if the metal had become soft, like clay in the hands of the potter. Well, indeed, may it be said, that, 'the steam-engine has infinitely increased the mass of human comforts, and rendered cheap and accessible all over the world the materials of wealth and prosperity. It has armed the feeble hand of man with a force to which no limits can be assigned; completed the dominion of mind over the most refractory qualities of matter; and laid a sure foundation for all those future miracles of mechanical power which are to add to and reward the labours of after generations. Already it has become alike stupendous for its force and its flexibility. The trunk of an elephant that can pick up a pin, or rend an oak, is nothing to it. It can engrave a seal, and crush masses of obdurate materials, draw out, without breaking, a thread as fine as gossamer, and lift a ship of war like a bauble in the air. It can embroider muslin and forge anchors, cut steel into ribbons, and impel loaded vessels against the fury of the winds and the waves.' A few years ago Mr. Fairbairn calculated that there was in the British Islands, or afloat, a total steam power equivalent to eleven millions of horses working; viz. in mining and the manufacture of metal, 450,000; in manufactures, 1,350,000; in steam navigation, 850,000; and in locomotives on land, 1,000,000.

STEAM-GUN, a contrivance for projecting the balls or other missiles used in warlike operations, by the expansive force of steam. The invention is chiefly due to Perkins, who is known for many useful contrivances; but it has never been submitted to the test of experience in actual warfare. As early as 1805, the French general Chasseloup is said to have shown the possibility of preparing steam artillery. In 1814, a French engineer constructed ordnance of this sort: the generator furnishing steam for six pieces of artillery, while the turning of a cock supplied all the pieces at once with the balls and steam; this machine could make 150 discharges in a minute.

STEAM NAVIGATION, is the application of the steam engine to the propulsion of vessels. The mechanism, to which the power of the steam is applied, may be either *paddle-wheels* or *screw propeller;* the former being merely an undershot water wheel, which, instead of driving the machinery is driven by it [see PADDLE-WHEEL], and the latter a screw which draws the vessel through the water [see SCREW PROPELLER], as the water against which the *paddles,* or the *blades,* act affords only an imperfect resistance. Not only is the vessel moved forwards, but some of the power is expended in moving the water backwards. In 1543, Blasco Garay exhibited to Charles V. a vessel moved by paddle-wheels driven by steam; but the way in which the motion was produced by the steam is not known. Since the year 1618 various contrivances have been proposed in England for the propulsion of vessels by steam. After several preliminary experiments, a vessel driven by steam was tried on the Forth and Clyde Canal, in 1789, by Miller, and it attained a velocity of nearly seven miles an hour. In 1801, a steam-engine, constructed on Watt's principles, was applied to a vessel constructed for the Forth and Clyde Canal Company; but the project was abandoned, in consequence of the fear entertained that the banks of the canal would be injured. The vessel which had been constructed was visited by Fulton, an American, and put into operation at his request; after which he caused an engine to be made by Bolton and Watt, for a vessel in America, which was to be propelled with paddle-wheels like that which he had seen in Scotland. This experiment was so successful that it was followed, in America, by the construction of many similar vessels. In 1812, the first steamboat used in Europe for commercial purposes was built on the Clyde, and this also was followed by many others. Steam vessels were soon afterwards used at sea; and regular lines were established between Greenock and Belfast, Dublin and Holyhead, Dover and Calais, &c. At length steam was applied to ships traversing the ocean, and it is now used in voyages to all parts of the world. Wheels having *feathering* paddles have sometimes been employed, but they are more complicated and liable to accidents; and, with a given amount of fuel, they do not seem to produce a greater effect than the ordinary kind. Some of the steamers now in common use have engines of nominally 1200 horse power; and, as they work not 8, but 24 hours a day, they are really equivalent to 3600 horses. But they are far exceeded by those of the *Great Eastern*, the largest vessel ever yet constructed. Her length is 695 feet, her depth nearly 60 feet; her paddle-wheels are 56 feet in diameter, her screw propeller 24 feet in diameter, and its shaft 164 feet in length. Her paddle-wheels are driven by four oscillating cylinders, each 74 inches in diameter and 14 feet stroke. Her screw is driven by four cylinders, each 84 inches in diameter and 4 feet stroke, and a single casting weighing 34 tons; her screw and paddle engines, taken together, are estimated at 12,000 horse power. There are 7000 tons of iron in her hull, 10,000 iron plates, and 2,000,000 of rivets. She has 6 masts and 5 funnels, with a fleet of boats. Her crew is about 400, and she can accommodate 4000 passengers. She uses 9 tons of coal per hour. When loaded she will weigh about 30,000 tons. The iron-cased frigates, some of which have been already completed, are of vast size. The *Warrior* is upwards of 400 feet in length, and 6000 tons tonnage. She is of iron, from 5 feet below the water line to the level of her upper deck she is fortified by armour plates 4½ inches thick, bolted on blocks of teak 18 inches thick, inside of which are the ordinary casing plates of the ship, ⅝ of an inch thick. Her main and upper decks are wood lined with iron. To improve her sea-going qualities her armour extends only for 300 feet amidships, her extremities being constructed in the ordinary way, her bows being made of great strength, to enable her to run into another ship. And to protect her from a raking fire, she has bulkheads fore and aft, fortified with armour like her sides. Her iron sternpost weighs 42 tons, and is the largest forging ever made. She cost 250,000*l.*

STEAR'IC ACID (*stear*, fat: *Gr.*), in Chemistry, a solid substance with acid properties, obtained by the saponification of *stearine*, one of the proximate principles of fats. Stearine may be obtained from mutton fat by melting it and mixing it with ether. When the whole has cooled, stearine crystallizes out. If the stearine be boiled with a strong solution of caustic potash a soap is formed, and when this is decomposed by an acid, stearic acid and glycerine are obtained. For commercial purposes, stearic acid is obtained by a different process, which need not here be detailed. Stearic acid is insipid and inodorous; after having been melted by heat it solidifies at 158° Fahr. into white brilliant needles grouped together It is insoluble in water, but dissolves in all proportions in boiling anhydrous alcohol; kindled in the open air it burns like wax. In the manufacture of candles it is melted in a silver pan, because other metals would colour it; when at a proper temperature it is poured into the moulds, and forms a candle closely resembling one made with wax. If the temperature, during fusion, is raised too high, the acid crystallizes, and becomes brittle; two qualities by which it is rendered nearly unsaleable, but which may be prevented by the addition of a little wax, magnesia, or French chalk.

STE'ATITE (*stear*, tallow: *Gr*), SOAPSTONE [which see] It is used in the manufacture of porcelain; also for taking greasy spots out of silk and woollen stuffs; and it is employed in polishing gypsum, serpentine, and marble

STEEL, a compound of iron and carbon in various proportions, that used for ordinary purposes seldom containing more than two per cent of carbon Steel should be manufactured from the purest iron. One process for making it is that termed *Cementation*, which consists in filling a suitable furnace with boxes containing alternate strata of malleable iron bars, and powdered charcoal, and keeping the whole for several days at a red heat, the atmospheric air being excluded During this process the texture of the iron, which was fibrous, becomes *granular*, and its surface assumes a blistered appearance: the product being hence termed *blistered steel.* Several bars of the latter being welded together, and the process being repeated, *shear steel* is the result; this being broken in pieces, and melted in a crucible, forms *cast steel*, which possesses equality of texture and a capability of being rendered extremely hard, as well as of taking a fine polish. *Natural*, or *German steel*, is produced directly from the pig iron, and afterwards refined; it is consumed largely in Germany and Austria, and is exported in great quantities to different parts of America. In this country steel has been very successfully manufactured from crude iron, which contains a much greater proportion of carbon than steel. The Bessemer process consists in blowing atmospheric air into the melted pig iron in the converting vessel, and this operation is continued until the oxygen has effected a combination with all the carbon, except the quantity required to form steel. It has also been manufactured in such a way that the bars contain cores of iron; this gives all the hardness of steel, and the tenacity of iron; and prevents articles made of it from breaking off short, as they frequently do, when formed only of hardened steel. The property on account of which steel is so valuable consists in its being rendered extremely hard by being heated to redness, and quenched in water, and in this hardness being capable of modifications by tempering, so as to be accompanied, when necessary, with great tenacity and elasticity. *Tempering* consists in reheating the steel to a temperature which depends on the degree of hardness and other qualities that are to be possessed by the article; and indicated by the colour given to a polished portion of it. When this colour is reached the steel is immediately plunged into water, to prevent any further rise in temperature. Pale straw colour indicates great hardness; a deep blue, great softness; and the intermediate shades, various degrees of hardness. A number of other metals have been combined with steel, giving rise to *silver steel*, &c.; but good common steel seems equal to any of these combinations. Steel may be made three hundred times dearer than standard gold, weight for weight.

STEEL'YARD, or ROMAN BALANCE, in Mechanics, a balance by which the gravities of different bodies are found, with the assistance of a single weight It consists of a rod or bar marked with notches, designating the number of pounds and ounces, and a weight which is movable along this bar, and is made to balance the body to be weighed, by removal to a proper distance from the fulcrum. This forms a lever of the first order.

STEER'AGE, in a ship of war, an apartment before the bulk-head of the great cabin, where the steersman stands Also an apartment in the forepart of a ship, for passengers.——*Steerage-way*, that degree of progressive movement of a ship which renders her governable by the helm ——*Steersman*, the man at the helm, employed to regulate the ship's course

STEGNOT'ICS (*stegnōtikos*, astringent; from *stegnoo*, I check bleeding: *Gr.*), medicines proper to stop the orifices of the vessels of the body, when relaxed or lacerated.

STELE, or STELA (*Gr.*), a pillar or upright stone tablet erected by the Greeks and Romans to mark a boundary, or as a memorial of some event. Stelæ came to signify monuments over the dead, whether they consisted of a single stone or were of a more elaborate nature. [See CIPPUS.]

STEL'ECHITE, a fine kind of *storax.*

STEL'LATE (*stellatus*, relating to a star: *Lat.*), in Natural History, an epithet given to anything that has parts radiating from a centre.

STEM, in Botany, that part of a plan which sustains the leaves and flower. The main stock, which supports the branches.——*Stem*, in Ship-building, the circular piece of timber into which the two sides of the ship are united at the fore-end; the fore part of the ship, as opposed to the stern.——*From stem to stern*, from one end of the ship to the other.

STEM'PLES, in Mining, cross bars of wood in the shafts of a mine.

STEN'CILLING, a method of painting on walls with a stencil, so as to imitate the figures on paper hangings.

STENOG'RAPHY (*stenos*, scanty; and *grapho*, I write: *Gr.*), the art of writing in short-hand, by using abbreviations or characters for whole words.

STENTO'RIAN (from *Stentor*, a herald, in Homer, whose voice was as loud as those of fifty men), able to utter a very loud sound.

STEPPE, a word probably of Tartar origin, used in Physical Geography to signify a level waste, destitute of trees. There are extensive steppes in the Russian empire.

STE'REOCHROME (*stereos*, solid; *chroma*, pigment: *Gr.*), a process of painting on walls, using WATER-GLASS as a means of fixing the colours in the plaster. This process has several advantages over fresco, since damp and atmospheric influences do not injure pictures in stereochrome, whilst the painting admits of being retouched, and joinings may be dispensed with. Stereochrome has been adopted on a large scale by Kaulbach in decorating the internal walls of the New Museum at Berlin, and it has been lately used in some of the wall painting in our houses of parliament.

STEREO'GRAPHY (*stereos*, solid; and *grapho*, I write: *Gr.*), the art of drawing the figures of solids upon a plane.

STEREOM'ETRY (*stereos*, solid; and *metreo*, I measure: *Gr.*), that part of Geometry which teaches the art of measuring solids or ascertaining the solid contents of bodies.

STER'EOSCOPE (*stereos*, solid; and *scopeo*, I examine; *Gr.*). No picture can give an exact representation of a solid: for the eyes, to a certain extent, look *round* the solid body, each of them seeing more of one side than of the other: and the two pictures in the eyes not being absolutely the same. This may be easily proved, by placing a small cylinder of any kind on a table, and marking by dots, &c., the width of the part seen by each eye, when the other is closed, the head being kept in the same position. The stereoscope has been invented to meet this peculiarity of vision. The most common form of instrument consists of a small box, in the back of which is placed an oblong slide, containing two photographic pictures of the same object, taken in two slightly different positions of the camera obscura [see PHOTOGRAPHY]. These pictures are both seen at once, each by the eye which corresponds to it, by means of two small tubes, containing lenses adjusted to the circumstances of, and the distance between the eyes of the observer. The result is, that the eyes combine the two pictures, and the object appears to stand out in relief, in other words to possess solidity; they are viewed by transmitted light if they are transparent, and by reflected light if opaque. [See PSEUDOSCOPE.]

STEREOT'OMY (*stereos*, solid; and *tomē*, a cutting: *Gr.*), the science or art of cutting solids into certain figures or sections; as walls or other members in the profiles of architecture.

STE'REOTYPE (*stereos*, solid; and *tupos*, a copy: *Gr.*), an entire solid plate or piece of type, cast from an impression in plaster of a page composed with moveable types. The advantage of *stereotyping* a book consists in being able, at a trifling expense, to print copies as they are required by the public. If this plan be not adopted, either a large number of copies must be thrown off at first, and these may not be called for, or the book must be retained in type, or all the expense of setting up the type, correcting the press, &c., must be again incurred whenever the number originally printed has been disposed of. Stereotypes are easily made, and impressions are taken from them with great facility. Alterations may, if required, be made in them; but it is not desirable to stereotype a work likely to be much altered. When a work is once thoroughly corrected, the stereotyping it secures accuracy.

STER'LING, in English Commerce, a term which is applied to money; signifying that it is of the fixed, or standard, national value; thus, 'a pound sterling' is not indefinitely 'a pound,' but 'an English pound.' Camden appears to offer the true etymology of this word, when he derives it from *easterling*, and corroborates, if not demonstrates, the propriety of this suggestion, by quoting old deeds, where English coin is always called *nummi easterlingi*. In explanation, he observes, that in the reign of Richard I. money coined in the eastern part of Germany grew to be much esteemed in England, on account of its purity; it was called *easterling* money, as all the people of those parts were called easterlings; and in consequence of the good character of their own money, some of the *easterling* coiners were invited into this kingdom, to perfect its coinage, which was thenceforward denominated *easterling*, *esterling*, *sterling*. [See EASTERLING.] During a considerable period, the only coin in England was one of about the value of a penny: whence it happens, that many ancient writers use the word *easterling* as a substantive, and synonymously with *penny*.——The word *sterling* has also a more general application. We speak of *sterling* value, *sterling* worth, or *sterling* wit; thereby meaning genuine and of good quality.

STERN, the hind part of a ship or other vessel.——*Stern-chase*, a cannon placed in a ship's stern, pointed backward, and intended to annoy a ship that is in pursuit of her.——*Stern-frame*, the several pieces of timber which form the stern of a ship.——*Stern-post*, a straight piece of timber, erected on the extremity of the keel to support the rudder, and terminate the ship behind.

STER'NUM, in Anatomy, the *os pectoris*, or breast-bone, a bone which composes the fore-part of the breast, and into which the ribs are fitted. It forms the front of the human chest from the neck to the stomach. The *sternum* is wanting in fishes, amphibians, and ophidians. In birds it is largely developed, and has a projecting-keel.

STER'TOR, a noisy kind of respiration, such as is observed in cases of apoplexy; loud snoring or snorting.

STETH'OSCOPE, in Medicine, a tubular instrument, usually of wood, for enabling the physician to hear the sounds made by the action of the heart and lungs, and thus discover the nature and seat of disease. When in use, the physician applies the stethoscope to the chest or abdomen of a patient, and places the ear to the narrow end. This useful instrument was invented by Laennec in the 18th century.

STEW'ARD. The greatest officer under the crown is the *lord high steward of England*, an officer that was anciently the inheritance of the earls of Leicester, till forfeited by Simon de Montfort to king Henry III. But the power of this officer was so great that it has not been judged safe to trust it any longer in the hands of a subject, excepting only occasionally; as to officiate at a coronation, at the arraignment of a nobleman for high treason, or on other solemn occasions. During his office, the steward bears a white staff in his hand, and on the trial, &c. being ended, he breaks the staff, and with it his commission expires. There is likewise a lord steward of the royal household, who is the chief officer of the court, &c.——In colleges, an officer who provides food for the students, and superintends the concerns of the kitchen. ——In a ship of war, an officer who is appointed by the purser to distribute provisions to the officers and crew. In other ships, a man who superintends the provisions and liquors, and supplies the table.

STHE'NIC (*sthenos*, strength: *Gr.*), in Medicine, an epithet applied to diseases in general which arise from inflammation or increased action; the opposite of *asthenic* diseases, or such as arise from debility.

STICK'LEBACK, the name given to some small freshwater fishes allied to the genus *Gasterosteus*. The commonest British species is the *G. trachurus*, whose tail is square in section. The sides are covered with large bony plates, and on the back are three sharp spines capable of elevation or depression at pleasure.

STIG'MA (a mark: *Gr.*), in Botany, that part of the pistil which receives the pollen when it issues from the anther. It is glandular, and thus detains the powder.

STIGMA'TA (marks: *Gr.*), the external pores by which air enters the tracheæ of insects.——*Stigmata*, in Antiquity, certain marks impressed on the left shoulders of the soldiers when enlisted.——*Stigmata* were also a kind of notes or abbreviations, consisting only of points disposed various ways, as in triangles, squares, crosses, &c.——In Roman Catholic Hagiography, marks of the five wounds of Christ, pretended to have been miraculously impressed on the bodies of certain saints.

STIG'MATIZING (*stigmatizo*, I brand: *Gr.*), in Antiquity, the act of affixing a mark upon slaves: sometimes as a punishment, but more usually in order that they might be recognised. It was done by applying a red-hot iron, marked with certain letters, to their foreheads, till a fair impression was made, and then pouring ink into the furrows, that the inscription might be the more conspicuous. *Stigmatizing*, among some nations, was, however, looked upon as a distinguishing mark of honour and nobility.

STIL'BITE (*stilbos*, glittering: *Gr.*), a mineral of a shining, pearly lustre, and a whitish or gray colour. It has sometimes been called *Foliated zeolite* or *Radiated zeolite*.

STILL (*stillo*, I drop: *Lat.*), a chemical apparatus for vapourising compound fluids, and re-condensing the vapours of each of the component parts as they are successively raised by heat. It consists of a body, or boiler, a worm, a refrigerator, and a receiver.

STILPNOSIDE'RITE (*stilpnos*, glittering; and *sidēros*, iron: *Gr.*), a mineral of a brownish black colour, massive, in curving concretions, splendent and resinous. It is a native oxide of iron.

STIM'ULANT (*stimulo*, I incite: *Lat.*), in Medicine, an epithet for whatever excites and increases the action of the bodily organs.——*To stimulate*, in a general sense, is to rouse or animate to action by some powerful motive. In a medical sense, to excite or increase bodily action; as to *stimulate* a torpid limb, or to *stimulate* the stomach and bowels.

STIM'ULUS (*Lat.*), any medicine or aliment which increases or excites the energy of an animal.

STING, an organ projected by many insects in defence against real or supposed dangers. In most instances, this instrument is a tube, through which a poisonous matter is discharged, which inflames the flesh, and in some instances proves fatal.

STIPEN'DIARY (*stipendiarius*; from *stipendium*, pay: *Lat.*), one who performs services for a settled compensation, or stipend, either by the day, month, or year.

STI'PES, or **STIPE** (*stipes*, the trunk of a tree: *Lat.*), in Botany, that part of a palm or a fern which bears the leaves and flowers.

STIP'ITATE (*Lat.*), in Botany, supported by or elevated on a stipe.

STIP'PLING, in the Arts, a method of engraving in dots, as distinguished from *etching* in lines. [See ENGRAVING.]

STIP'ULA, or **STIP'ULE** (*Lat.*), in Botany, a small appendage or scale at the base of nascent petioles; stipules are in pairs or solitary. Leaves that are destitute of them are said to be ex-stipulate.

STIR'RUP in Ship-building, a piece of timber put under the keel when some part of it is lost.——*Stirrups*, in a ship, short ropes, having their upper ends plaited, nailed round the yards, and with eyes in their lower ends, through which the hawsers are reeved, to keep them parallel to the yards.

STI'VER, a Dutch coin, equal to about a halfpenny in value.

STO'Æ (*stoai : Gr.*), in Antiquity, porticos in Athens, which were the resort of philosophers, particularly of the Stoics.

STOAT, Ermine weasel. [See ERMINE.]

STOCK (*stoc: Sax.*), in Commerce, any fund consisting of money or goods employed by a person in trade. It is a general name for the capitals of our trading companies. And also denotes any sum of money which has been lent to government, on condition of receiving a certain interest till the money is repaid. Hence the price of stocks, or rates per cent., are the several sums for which 100*l.* of those respective stocks sell at any given time.——*Stock*, the wooden part of many instruments, as the *stock* of an anchor, the *stock* of a gun, &c.——*Stock*, in Agriculture, the domestic animals or beasts belonging to the owner of a farm; as a *stock* of cattle or of sheep. Cattle are also called *live stock.*——*Stocks* (plur.), a machine consisting of two pieces of timber, in which the legs of criminals are confined by way of punishment.——*Stocks*, the frame or timbers on which a ship rests while building. Hence we say, 'a ship is *on the stocks*'

STOCK'-BROKER, one who deals in the purchase and sale of stocks, or shares in the public funds, for others.

STOCK'-DOVE, the *Columba œnas*, or wild pigeon of Europe, long considered as the *stock* of the domestic pigeon, but now regarded as a distinct species.

STOCK'-EXCHANGE, the place or building where the public stock is bought and sold. The *Stock-exchange*, situated in Capel-court, was opened in 1802. Formerly the place of rendezvous for persons transacting business in the stocks, was Jonathan's coffee-house, in 'Change Alley, Cornhill, and it is from this circumstance that the expression *Alley* is familiarly used, as a cant phrase for the Stock-exchange, and that a petty speculator in the funds is styled a 'dabbler in the alley.' [See EXCHANGE.]

STOCK'-JOBBER, one who makes it his business to buy and sell stocks and shares on his own account. Stockbrokers deal with him, and hence it happens that there are two prices for the same commodity in the market, one for buyers and another for sellers.——*Stock-holder*, one who is a proprietor in the public funds; or in the funds of a bank; or other company.

STOCK'INGS are made either of silk, wool, cotton, or thread, &c.; by the hand, or woven in a frame. Silk stockings were first worn by Henry II. of France, 1547. Howell says, 'that, in 1560, queen Elizabeth was presented with a pair of black silk knit stockings by her silk-woman, Mrs. Montague, and she never wore cloth ones any more.' He adds, 'that Henry VIII., that magnificent and expensive prince, wore ordinarily cloth hose, except there came from Spain, by great chance, a pair of silk stockings for gala-days.' The English and French have often contested the honour of inventing the stocking-frame; but whatever pretensions the French may suppose they have to it, this honour was certainly due to Mr. W. Lee, of Woodborough, Nottinghamshire. He attempted to set up an establishment at Calverton, near Nottingham, but instead of meeting with that success to which his genius and inventions so well entitled him, he was discouraged and discountenanced. Being, however, invited by Henry IV. of France, who promised him a magnificent reward if he would carry his machinery to that country, he settled at Rouen, where he introduced the stocking-frame with distinguished success; but after the assassination of the king, the concern got into difficulties, and Lee died in poverty at Paris. Some of the workmen who had emigrated with him returned to England, and established themselves in Nottinghamshire, which still continues the principal seat of the manufacture. During the course of the last century the machine has been very greatly improved.

STO'ICS (*stoikio : Gr.*), in Antiquity, a sect of philosophers among the Greeks, whose founder was Zeno. They denied the existence of innate ideas; and consequently held that sensation and reflection were the only foundations of human knowledge. They taught that the true end of man consists in living conformably to nature, and in obedience to his internal monitor, that particle of the divinity which constitutes the soul. They taught that good is what conducts men to felicity, and that all good things are equal; that passions arise from false judgments; that duty consists in the investigation of moral truth, and in living agreeably to the obvious destination of our nature. They had also paradoxes peculiar to themselves, asserting that pain is no evil; that a wise man is free from all perturbation of mind; and that it is the duty of man to submit without complaint to the unavoidable necessity imposed on him by his destiny. [See PHILOSOPHY.]

STO'LA (*Lat.; from stolē: stello*, I equip: *Gr.*), in Antiquity, a long robe in use among the Roman ladies, over which they wore a large mantle, or cloak, called the *pallium.*——Also a sacerdotal ornament worn by the Roman Catholic parish priests over their surplice, as a mark of superiority in their respective churches; and by other priests over the alb while celebrating mass.

STOLE, GROOM OF THE. An officer in the household of the British Sovereign. The place is a sinecure, and when a female sovereign occupies the throne, it is usually held by the mistress of the robes. The stole is a narrow vest lined with crimson silk, and formerly embroidered with roses, fleur de lis, and crowns.

STOM'ACH (*stomachos ; from stoma*, a mouth, literally an opening: *Gr.*), in Anatomy, a hollow membranous receptacle, situated in the epigastric region, immediately under the diaphragm, and obliquely between the liver and the spleen; the superior orifice of which is termed the *cardia*, and the inferior the *pylorus.* The use of the stomach is for the digestion of food; that is, to receive, contain, dissolve, and change what is swallowed; and after a sufficient concoction, to expel it through the pylorus into the intestines. It is also the organ in which the sensation of hunger resides. The stomach is largely supplied with nerves, which come from the eighth pair, and the sympathetic; like the intestines, it has three coats, connected together by cellular membrane.

STOMACH'ICS (*stomachikos*, for the stomach: *Gr.*), medicines which excite the action and strengthen the tone of the stomach.

STOM'ACH-PUMP, a small pump for removing poisons from the stomach. It resembles the common syringe, except that there are two apertures near the end, instead of one, which, owing to valves in them, that open different ways, become what are called a *sucking* and a *forcing* passage. When the object is to extract from the stomach, the pump is worked while its sucking orifice is in connection with an elastic tube passed into the stomach; and the discharged matter escapes by the forcing orifice. When it is desired, on the contrary, to inject water or other liquid into the stomach, the connection of the apertures is reversed.

STO'NE-CROP, a name given to plants of the genus *Sedum*. The stone-crop tree or shrubby glass-wort is of the genus *Chenopodium*.

STO'NE-FRUIT, a *drupe*, or kind of fruit in which the seed or kernel is enclosed in a hard case, covered with pulp; as cherries, plums, &c.

STO'NEHENGE, the remains of a structure supposed to have been erected by the ancient Britons; still extant upon Salisbury Plain, in Wiltshire. It consists of many unhewn stones, which, with some that are wanting, appear to have originally composed four ranks, one within another. Some of them, especially in the outermost and the third ranks, are twenty feet high and seven broad. The vertical stones sustain horizontal ones, laid across their heads, and fastened by mortises. The whole is supposed to have been once joined together. The purpose of a place of this description among the generations which, two thousand years ago, peopled the island of Britain, seems to have been that of religious worship. The matter has excited much discussion amongst antiquarians.

STONE. The ancients were far more careful than the moderns in selecting good materials for their public edifices; and hence, notwithstanding all the casualties to which they were exposed, such magnificent remains of them exist even at the present day. The most important building stones in Britain are, *Granites*, obtained chiefly in Cornwall, Devonshire, Leicestershire, Aberdeenshire, Wicklow, and Carlow; *Porphyries*, *Syenites*, and *Elvans*, in Cornwall, Devonshire, Leicestershire, and many parts of Scotland and Ireland; *Sandstones*, chiefly in Yorkshire, Derbyshire, Shropshire, Surrey, &c., in several parts of Scotland—the Portland and Craigleith kinds being included; *Millstone grit*, found abundantly in Derbyshire, Yorkshire, and most of the coal districts; *Dolomites* or *Magnesian limestones*, in Yorkshire, Durham, Northumberland, Derbyshire, and Nottinghamshire; *Olites*, of which bathstone is an example, and which are obtained of excellent quality in the quarries of Ancaster and Kelton; *Limestones*, which are extremely varied, and of which Purbeck marble, Derbyshire marble, Lias Devonian limestone, and mountain limestone, are examples; *Slates*, obtained abundantly in North Wales, Devonshire, Cornwall, and some parts of Scotland and Ireland.

STONE ARTIFICIAL, the invention of Mr. Ransome, is composed of sand chalk or other mineral substance intimately mixed with WATER-GLASS. When still plastic it can be pressed into blocks or moulds, or it can be rolled into slabs. It is then saturated with a solution of chloride of calcium, when a double decomposition of the two solutions employed takes place. The silica of water-glass combines with the calcium, and at once forms an insoluble silicate of lime in the pores of the new stone which firmly cements together all its particles, whilst the chlorine combines with the soda and forms common salt, which is removed by simple washing. The resulting stone is exceedingly strong and is likely to be very durable. Another method, the invention of Messrs. Bartlett, consists in employing a mixture of water-glass with a solution of aluminate of soda. The resulting silicate of alumina when dried in the pores of the stone is perfectly insoluble in water.

STO'RAX (*Lat.*), a resinous and odoriferous drug, or solid balsam; of a reddish brown colour. It is obtained from the *Styrax officinalis*, a tree which grows in Syria. It is a stimulating expectorant. *Liquid storax*, or *styrax*, is a liquid or semi-fluid balsam, obtained from the *Liquidamber stiraciflua*, a tree which grows in Virginia. Trees in other parts of the world belonging to the same genus also yield liquid storax.

STORK, the name of large grallatorial birds belonging to the genus *Ciconia*. They are nearly allied to the crane and the heron. Besides the common or white stork (*Ciconia alba*) there is another European species, viz. the black stork, with the breast and belly white, an erect and beautiful bird somewhat larger than the common heron. ——In Heraldry, the stork, as an emblem of piety and gratitude, is a frequent bearing in coat armour.

STORMS. The causes which produce storms, tempests, hurricanes, &c., are very obscure. It is difficult to arrive at general laws regarding them; since it is not easy to obtain an exact knowledge of the various circumstances which accompany them. Storms are violent and destructive in the torrid zone; they are comparatively insignificant in temperate, and are scarcely known in polar regions. It was formerly supposed that a storm was merely a wind blowing in a certain direction at the rate of 100 or 120 miles an hour; but it has been recently found to be far more complicated in its nature. There is reason to believe that, in the northern hemisphere, the great body of the storm whirls in a horizontal circuit, round a vertical or some what inclined axis of rotation which is carried forward with it; and that to a spectator placed in the centre the rotation is always from *right to left*. Storms travel in a direction differing from the actual movement of the wind at the time. When the storm progresses westward, the wind, at the commencement, is from a northern quarter, and towards the end from a southern. When the progressive motion is eastward, the phenomena are reversed; southern storms are subject to the same modifications as northern, but in a reversed order. In all latitudes, the barometer sinks during the first half of the storm, in every part of track; and rises during the second. It is asserted by some that in storms the tendency of the wind is from all round to some centre or central line, and there may be storms having this character also. Were the phenomena of storms well understood, the navigator might avoid those tracks in which they prevail at particular times; or, being caught by one, might steer the course by which he should soonest escape from it.

STO'RY-POSTS, in Carpentry, upright timbers disposed in the story of a building, for supporting the superincumbent part of the exterior wall by means of a beam over them.

STRABIS'MUS (*strabos*, oblique: *Gr.*), in Surgery, an affection of the eyes in consequence of which the optic axes cannot be both directed to the same object

STRAIT, or as it is generally written, STRAITS, in Geography, a narrow pass of the ocean, through which the water flows from one sea to another. The straits of Gibraltar, about 130 miles long and 12 broad, join the Mediterranean sea with the Atlantic ocean. The strait which joins the Baltic with the Atlantic is called the Sound; and that between Britain and France, the Straits of Dover.

STRAMO'NIUM, the *Datura Stramonium* of botanists, nat. ord. *Solanaceæ*, a plant growing wild in Europe and America. All parts of the plant exhale a strong and nauseous odour; and, taken internally, it is one of the most dangerous of narcotic poisons. It has, notwithstanding, been employed with advantage in convulsive and epileptic affections; and smoking the dried leaves has often proved beneficial in cases of asthma.

STRAPPA'DO, a Military punishment, not now used. It consisted in drawing an offender to the top of a beam, and letting him fall; by which means a limb was sometimes dislocated.

STRAT'EGY (*stratēgia*; from *stratos*, an army, and *ago*, I lead: *Gr.*), that branch of the military science which is concerned in the conducting operations in the field.

STRATIFICA'TION (*stratum*, a bed; and *facio*, I make: *Lat.*), in Mineralogy and Geology, a term signifying the process by which substances in the earth have been formed into strata or layers. Also, in Chemistry, the placing layers of different substances one upon another in a crucible.

STRATOC'RACY (*stratos*, the army; and *kratos*, power: *Gr.*), a Military government, or that form of government in which the soldiery bear the sway.

STRA'TUM (a bed: *Lat.*, plural *strata*), in Geology, a layer of rock or earth. The crust of the globe is built up of strata, into which igneous or non-stratified rocks have intruded. Stratified rocks (with the exception of those that have spread in sheets from some volcanic orifice) have been deposited by water and are turned sedimentary. The nature of their fossil contents will determinate whether the water was salt or fresh, whether the strata were spread over the bottom of an ocean, or a lake. Strata which were formed at the bottom of an estuary contain the remains of animals some of which lived in the river or on its banks, and others in the sea, into which that river debouched. The manner in which stratified deposits are thrown down may be seen whenever a lake is drained. All the streams that fed the lake brought their contributions of mud and sand, and spread them over the bottom of the lake. The mud of the Nile valley is stratified, and if a pit be dug in it, the layer of any year may be distinguished from that preceding and that following. Geologists suppose that the stratified rocks of the whole globe, which are many thousands of feet in thickness, have been similarly formed, and that they represent the accumulations of a countless series of ages, during which the different parts of the earth's crust have been again and again elevated above, and depressed below, the level of the ocean. The relative age of a stratum is determined not only by its position amongst other strata, but by the relationship of its organic remains to existing forms of life [See GEOLOGY.]

STRA'TUS (same *deriv.*), the name given by meteorologists to a widely extended continuous and horizontal sheet of cloud, increasing upwards from below. Mists ascending from valleys and sheets of water would be comprehended under this term.

STRAW'BERRY, the fruit of plants belonging to the genus *Fragaria*, nat. order *Rosaceæ*. The gardener's art has produced many varieties of this delicious fruit.

STREAM'-TIN, *Tinstone*, a native oxide of tin, found in rounded particles and masses, mixed with other alluvial matter; it furnishes the finest grain tin.

STRENGTH, in Mechanics, force or power. ——STRENGTH OF ANIMALS, the muscular force or energy which they are capable of exerting. The experiments made on this subject, by different persons, have given very different results; which is to be expected, since animal strength is liable to variations, from a great number of circumstances. The force which an animal is able to exert against an obstacle is greatest when the animal is still; when it is in motion, some of its force is employed to produce this motion. There is a velocity at which it can carry no load, and another at which it can do the maximum quantity of work. The same animal will exert very different amounts of force, with different kinds of work.——**STRENGTH OF MATERIALS**, **is the force with which a body resists an effort to** separate its particles. The strength of a body may be exerted in four ways; in resisting a force tending to tear it asunder; in resisting a force tending to break it across; in resisting compression or crushing; and in resisting a force tending to wrench it asunder by tortion.

STREPITO'SO, in Music, an Italian word denoting that the part to which it is prefixed must be performed in an impetuous and boisterous style.

STRI'Æ (*Lat.*), in Architecture, the fillets which separate the furrows or grooves of fluted columns.

STRI'ATED(*stria*, a groove: *Lat.*), in Natural History, an epithet given to anything which is marked with furrows.

STRI'DOR DEN'TIUM (*Lat.*), a grinding of the teeth.

STRIDULA'TION (*stridulus*, creaking: *Lat.*), the noise made by some insects, such as crickets and grasshoppers.

STRI'GÆ (*Lat.*), in Architecture, the flutings of a column.

STRIKE, in Geology. [See DIP.]

STRIX (*Lat.*, from *strinx*; from *strizo*, I cry shrilly: *Gr.*), in Ornithology, a genus of birds of which the owl is the type. [See OWL].

STRO'BILUS (*strobilos*, a fircone: *Gr.*), in Botany, a spike of fruit bearing scales, each of which covers one or two seeds, as amongst the coniferous order. Sometimes the scales are thin and membranous, as in the hop.

STRON'TIA, in Chemistry, an alkaline earth; it is an oxide of the metal *Strontium*, and occurs as a carbonate, in the lead mines of *Strontian* in Argyleshire; whence its name. It is a greyish-white infusible substance, having an alkaline reaction on vegetable colours, and an acrid burning taste. It heats when moistened, and slakes into a white pulverulent hydrate; its solution in hot water on cooling deposits crystals in foursided tables. Its salts give a red tinge to flame. The compounds of strontia, unlike those of baryta, are not poisonous.

STRON'TIANITE, in Mineralogy, prismatic barytes, or carbonate of strontian, a mineral that occurs massive, fibrous, stellated, and crystallized in the form of a hexahedral prism, modified on the edges, or terminated by a pyramid.

STRON'TIUM, a heavy white metal, which oxidizes in the air, and decomposes water at ordinary temperatures. Its equivalent is 43·8. It is obtained from its oxide called *Strontia*, which see.

STRO'PHE (*Gr.*, literally, a turning), in Greek poetry, a *Stanza*: the first member of a poem. This is succeeded by a similar stanza called the *antistrophe*, which see.

STRUC'TURE (*structura*; from *struo*, I erect: *Lat.*), in Mineralogy, the particular arrangement of the integrant particles or molecules of a mineral.

STRU'MA (*Lat.*), in Medicine, glandular tumours on the neck and throat indicating a scrophulous habit.

STRUT, in Architecture, a piece of timber placed obliquely from a king or queen post, to support a rafter [see ROOF]. It is also called a *brace*.

STRU'THIO (*Lat.*), in Ornithology, a genus of birds. [See OSTRICH.]

STRYCH'NIA, or **STRYCH'NINE** (*strychnos*, nightshade: *Gr.*), in Chemistry, a poisonous vegetable alkaloid, found in the seeds (*nux vomica*) of the *Strychnos Nux Vomica*, a tree belonging to the nat. ord. *Loganiaceæ*. It is in the form of white crystals, and its operation is accompanied by lockjaw and other tetanic affections.

STUC'CO (*Ital.*), in Architecture, a term applied to many calcareous cements; but usually employed to designate one consisting of fine lime and sand, used as the third coat in three-coat plaster. *Bastard stucco* contains a small quantity of hair.

STUD, in Building, a small piece of timber or joist inserted in the sills and beams, between the posts, to support the beams or other main timbers.—A collection of breeding horses and mares.

STUD'DING-SAIL, or *scudding sail*, in Navigation, a sail that is set beyond the skirts of the principal sails. The studding-sails are set only when the wind is light, and appear like wings in the yard-arms.

STUR'GEON (*sturio*: *Lat.*), a large cartilaginous fish of the genus *Accipenser*, having the body armed with rough bony tubercles, of which there are several series. The *isinglass* sturgeon grows to the length of twenty or twenty-five feet; though they are generally caught much smaller. There are four cirri at the extremity of the under jaw; the eyes are large, and stand at a great distance from the extremity of the snout. The flesh is much esteemed; from the roe is made *caviare*, and from the swim bladder isinglass. [See FISHERIES.]

STYLE, in Literature, a term used metaphorically, from the *stylus* or ancient pen, to signify the writing. *Style* is the choice and arrangement of words, or the manner in which a person expresses himself in writing. Although in a language there can be but one syntax, there may be many kinds of style, and all equally good. Swift says, 'proper words in proper places make the true definition of style.'—*Style*, in Chronology, the manner of computing time, with regard to the Julian or Gregorian calendar, and termed either *old* style or *new*. By the *old style* the year consisted of 365 days and 6 hours; but the new or Gregorian style was made to correspond more nearly with the period of the sun's revolution. [See CALENDAR.] The reformation of the style was made in 1577; but it was not adopted in Protestant countries until a considerable time after, and it has not yet been introduced into Russia or Greece. It was ordered to be used in England by statute, in 1752, being termed the *new style*; the 3rd September 1752 was reckoned the 14th; the year which hitherto began the 25th of March was thenceforward to commence the 1st January, and from the 1st January to the 24th March, which should have belonged to the end of the year 1751, was considered as the commencement of the year 1752. Thus, not only was the year 1751 made to consist of little more than nine months, but, in reality, January, February, and twenty four days of March were transferred from each year to that which had succeeded it. These changes account for the peculiar modes in which dates are sometimes given by authors of the last century. Sometimes the date is indicated to be according to the old style by O.S. Sometimes two numbers mark the date to both styles, as $\frac{19}{30}$ June 1753; or two different months, as $\frac{\text{30 June}}{\text{11 May}}$ 1758; or two different years, as $\frac{\text{23 Feb. 1753}}{\text{6 March 1754}}$.——*Style*, in Architecture, a particular mode of erecting buildings; as the *Gothic* style, the *Saxon* style, the *Norman* style, &c.——In Botany, the middle portion of the pistil, connecting the stigma with the ovary. They are of various shapes.

STYLI'TES (*stulos*, a pillar: *Gr.*), in Ecclesiastical History, a sect of solitaries, or fanatics, in the East, who performed a kind of penance by dwelling on columns or pillars; one of them, termed *Simeon Stylites*, is said to have lived thirty-seven years on several of various heights, the last he used being of very considerable elevation.

STYLO, in Composition, is applied to those muscles which are attached to the *styloid process* of the temporal bone; thus the *styloglossus*, which moves the tongue, &c.

STY'LOID (*stulos*, a writing pen; and *eidos*, form: *Gr.*), having some resemblance to a *stylus*, or pen; as the *styloid* process of the temporal bone.

STYP'TICS, medicines which have the property of stopping hemorrhage, or discharges of blood. The word *styptic*, though signifying nearly the same as *astringent*, is used in a different and more limited sense; *astringents* usually denoting internal applications for stopping bleeding, or for strengthening the solids; *styptics*, external applications for restraining discharges of blood.

STY'RAX (*Gr.*), in Botany, a genus of plants, nat. ord. *Styracaceæ*. The species are two, growing in warm climates, several of which yield the gum resin called STORAX.

SUB, a Latin preposition for *under* or *below*. It is used as a prefix to many English words, and denotes inferiority of rank or defect in quality; as subaltern, subordinate, &c. It is prefixed to words in a scientific description of a plant or animal to signify nearly but not quite.

SU'BAH, in India, a province or viceroyship. Hence *subahdar*, the governor of a province. *Subahdar* is also used for a native of India, who ranks as captain in the European companies.

SUB'ALTERN (*subalterne: Fr.*), a term for a military officer below the rank of captain.

SUBCLA'VIAN (*sub*, under; *clavicula*, the clavicle: *Lat.*), in Anatomy, an epithet applied to anything under the arm-pit or shoulder, whether artery, nerve, vein, or muscle.

SUBCON'TRARY, in Geometry, a term used when two similar triangles are so placed as to have a common angle at their vertex, and yet their bases not parallel.

SUBCOR'DATE (*sub*, slightly; *cor*, the heart: *Lat.*), in Botany, somewhat similar to a heart in shape.

SUBCOS'TAL (*sub*, under; *costa*, a rib: *Lat.*), in Anatomy, a term for the internal intercostal muscles.

SUBCUTIC'ULAR (*sub*, under; *cutes*, the skin: *Lat.*), in Anatomy, being under the cuticle or scarf-skin.

SUB-DOM'INANT, in Music, the fourth [illegible] above the tonic, being under the dominant.

SUB'EROSE (*suber*, cork: *Lat.*), in Botany, having the appearance of being gnawed or a little eaten.

SU'BEROUS (same *deriv.*), soft and elastic, like cork.

SUBJUNC'TIVE MOOD (*subjunctivus*, relating to binding together: *Lat.*), in Grammar, a form of the verb which mentions a thing *conditionally* or by way of *supposition;* and is denoted in the English language by the addition of *if*, *though*, or some other conjunction, expressed or understood.

SUBLAPSA'RIAN, in Theology, one who maintains that God *permitted* the fall of Adam without positively predetermining it; a doctrine which is in opposition to the *supralapsarian* of high Calvinism.

SUB'LIMATE, in Chemistry, any substance procured by the process of sublimation.

SUB'LIMATION, an operation by which solids are changed by heat into vapour, and then condensed into a solid form again; it differs from distillation, in which the vapour is condensed into a liquid. This process is often used to purify or separate substances. When the crystals obtained by sublimation are extremely minute, so as to present the appearance of a powder, they are sometimes termed *flowers:* thus flowers of sulphur.

SUB'LIME (*sublimis: Lat.*), an abstract quality which like Beauty is not capable of precise definition. Whilst a beautiful object pleases and delights us a sublime one astonishes, and the sensations excited by a grand object seem to stand between those caused by the other two. The Material sublime is excited by the vastness of some object in nature; such as a range of lofty mountains. The Spiritual sublime projects our thoughts at one stroke into the illimitable. The material works of man may be grand, but are seldom if ever sublime, except in so far as they act in raising in us the sense of spiritual sublimity.

SUBLIME PORTE, the state ministry and council of the Turkish Sultan. The grand vizir is president, and under him are the minister for home affairs, the minister for foreign affairs (the Reis Effendi), and the minister of the executive power.

SUBLIN'GUAL (*sub*, under; and *lingua*, the tongue: *Lat.*), in Anatomy, situated under the tongue; as the *sublingual glands*, which secrete the saliva.

SUBLUXA'TION (*sub*, in some degree; and *luxatus*, a dislocation: *Lat.*), in Surgery, a violent sprain or incomplete dislocation.

SUBMARI'NE (*sub*, under; and *mare*, the sea: *Lat.*), an epithet for what exists or happens under the sea or water; as a *submarine* explosion, or *submarine* telegraph, &c.

SUBMAX'ILLARY (*sub*, under; and *maxilla*, the jaw: *Lat.*), in Anatomy, an epithet for two salivary glands, situated immediately within the right and left angles of the lower jaw.

SUBME'DIANT, in Music, the sixth note, or middle note between the tonic and subdominant descending.

SUBMUL'TIPLE, in Arithmetic, a number or quantity contained in another number or quantity a certain number of times: as 4, which is the submultiple of 24, being contained in it six times.

SUBNU'DE (*sub*, in some degree; and *nudus*, naked: *Lat.*), in Botany, an epithet for a plant almost naked or bare of leaves.

SUBOCCIP'ITAL (*sub*, under; and *occiput*, the back part of the head: *Lat.*), in Anatomy, under the occiput; as, the *suboccipital nerves*.

SUBORNA'TION (*suborno*, I suborn: *Lat.*), in Law, the crime of procuring a person to take such a false oath as constitutes perjury.

SUBPŒ'NA (under the penalty: *Lat.*), in Law, a writ commanding the attendance in court of the person on whom it is served. —*Subpœna ad testificandum*, compels to attend and give evidence.——*Subpœna duces tecum* compels to bring a written document for the purpose of producing it at the trial.

SUBREP'TION (*subripio*, I take away privily: *Lat.*), the act of obtaining a favour by surprise or unfair representation, that is, by the suppression of facts.

SUBROGA'TION (*subrogo*, I substitute: *Lat.*), in the Civil Law, the substituting of one person in the place of another, and giving him his rights.

SUB'SALT, in Chemistry, a salt with less acid than is sufficient to neutralise its radicals.

SUBSCAP'ULAR (*sub*, underneath; and *scapula*, the shoulder blade: *Lat.*), in Anatomy, beneath the scapula.——The *subscapular artery* is the large branch of the axillary artery which rises near the lowest margin of the scapula.

SUBSCRIP'TION (*subscriptio*; from *subscribo*, I write underneath: *Lat.*), the act of signing or setting one's hand to a paper. The word is frequently employed with reference to the oaths and test articles which persons are compelled to take and subscribe on admission to membership in a university, or into the established church, or to an office under government.

SUB'SIDY (*subsidium*: *Lat.*), an aid or tax granted to the king, by parliament, upon any urgent occasion, and levied according to a certain rate on lands and goods; but, in some of our statutes, it is confounded with *customs*. It sometimes signifies, in modern usage, a sum of money given by the government of one nation to that of another, for the immediate purpose of serving the latter, and the ultimate one of benefiting the former. Thus Great Britain *subsidised* Austria and Prussia, to engage those powers in resisting the progress of the French in the time of the first Napoleon. It is also employed with reference to a payment of public money to a company towards the support of a line of steamers, or of a theatre, as in France.

SUB'SOIL, the bed or stratum of earth which lies beneath the surface-soil: the *substratum*.

SUB'STANCE (*substantia*: *Lat.*), something that we conceive to subsist of itself, independently of any created being, or any particular mode or accident. Our ideas of substance, as Locke observes, are only such combinations of simple ideas as are taken to represent distinct things subsisting by themselves, in which the confused idea of substance is always the chief. Thus the combination of the ideas of a certain figure, with the powers of motion, thought, and reasoning joined to the substance, make the ordinary idea of a man; and thus the mind observing several simple ideas to go constantly together, which being presumed to belong to one thing, or to be united in one subject, are called by one name, which we are apt afterwards to talk of, and consider, as one simple idea.

SUB'STANTIVE (*substantivus*: *Lat.*), in Grammar, a noun or name, denoting a thing without any regard to its qualities; as, on the other hand, an adjective is the name of a quality. Thus of the words 'red house,' the first denotes a quality, and is therefore an adjective; the second a thing, and is therefore a substantive.

SUB'STITUTE (*substitutus*, put instead of: *Lat.*), in Law, one delegated to act for another.——In the Militia, one engaged to serve in the room of another.

SUB'STITUTION (*substitutio*; from *substituo*, I put instead of: *Lat.*), in Chemistry, the replacing of one or more atoms of one element in a compound body by the same number of atoms of another element. Thus, when water is decomposed by zinc on adding sulphuric acid, an atom of the zinc is substituted for an atom of hydrogen, the latter being expelled.

SUBSTRA'TUM (*sub*, underneath; and *stratum*, a bed: *Lat.*), in Geology, a layer of earth laid under another.——In Metaphysics, the matter or substance supposed to furnish the basis in which the perceptible qualities inhere.

SUB'STYLE (*sub*, underneath; and *stylus*, a gnomon: *Lat.*), in Dialling, the line on which the gnomon stands.

SUBSUL'PHATE, in Chemistry, a sulphate with an excess of the base.

SUBSUL'PHURET, in Chemistry, a compound of sulphur, with a metal, &c., in a less proportion than is contained in a sulphuret.

SUBSUL'TUS (*subsulto*, I hop: *Lat.*), in Medicine, a twitching or convulsive motion; as *subsultus tendinum*.

SUBTAN'GENT, in Geometry, the part of the axis contained between the ordinate and tangent drawn to the same point in a curve.

SUBTEN'SE OF AN ARC (*subtendo*, I stretch underneath: *Lat.*), a right line opposite to an angle, supposed to be drawn between the two extremities of the arc; a *chord.*

SUBTRAC'TION (*subtraho*, I draw away from: *Lat.*), in Arithmetic, the taking of one number from another of the same kind or denomination, an operation by which the difference between two sums is found. ——In Law, the withdrawing or withholding of some right. Thus, the *subtraction* of a legacy is the withholding or detaining of it from the legatee by the executor; and in like manner, the withholding of any service, rent, duty, or custom, is a *subtraction*, for which the law gives a remedy.

SUBTRAHEND' (*subtrahendus*, to be subtracted: *Lat.*), in Arithmetic, the number to be subtracted or taken from another.

SUB'ULATE (*subula*, an awl: *Lat.*), in Natural History, shaped like an awl, that is narrow and tapering to a point.

SUB'URBS (*sub*, near to; and *urbs*, a city: *Lat.*), the buildings, streets, or parts that lie without the walls, but in the immediate vicinity of a city. Hence *suburban*, inhabiting or being situated near a city.

SUCCEDA'NEUM (*succedaneus*, that supplies the place of: *Lat.*), that which is used for something else; a *substitute.*

SUC'CINATE (*next*), in Chemistry, a salt formed by succinic acid and a base.

SUCCIN'IC ACID (*succinum*, amber: *Lat.*), in Chemistry, an acid obtained by the destructive distillation of amber. It has also been obtained by the action of nitric acid on stearic and margaric acids. It forms regular colourless crystals, and is a compound of carbon, hydrogen, and oxygen.

SUC'CINITE (same *deriv.*), a mineral of an amber colour, considered as a variety of garnet. It frequently occurs in globular or granular masses, about the size of a pea.

SUC'CINUM (amber; from *succus*, juice: *Lat.*), a genus of minerals. [See AMBER.]

SUC'CORY, chicory or wild endive. [See CHICORY.]

SUC'CULENT (*succulentus; from succus*, juice: *Lat.*), in Botany, an epithet for such plants as have thick and juicy leaves such as the cactus order and many plants growing near the sea.

SUC'CUS (*Lat.*), in Pharmacy, a term frequently employed to denote the extracted juice of different plants, as the *Succus glycorrhizæ*, Spanish liquorice, &c.

SUCCUS'SION (*succussio*, a shaking: *Lat.*), in Medicine, a rough mode of ascertaining the state of the chest in disease, by shaking the patient's body and then listening to the sound produced.

SUCK'ER (*sugo*, I suck: *Lat.*), the piston of a pump; also a piece of leather laid wet upon a stone, which, owing to the pressure of the atmosphere, adheres very closely, and is not to be pulled off without great force.——*Sucker* (*surculus: Lat.*), a young twig shooting from the stock or lower part of the stem, and afterwards rooting.

SUCK'ING-FISH. [See REMORA.]

SUCK'ING PUMP, or SUC'TION PUMP, the ordinary pump with two valves opening upwards. When the piston is drawn up, the valve it contains closes, and any water or air above it is raised by it; a vacuum being at the same time produced under it, the lower valve is forced open by the external air, which drives the air or water underneath to pass up through it. When the apparatus is once charged with fluid each upward stroke of the piston lifts the water which is above it, and, by atmospheric pressure, fills the vacant space which is under it with water that rushes from the well through the lower valve. The downward motion of the piston forces the water which is under it, and which cannot return to the well, on account of the closing of the lowervalve, to rushup through the now open valve in the piston. The valve in the piston is, therefore, open at the downward stroke, and closed at the upward; and the lower valve is open at the upward stroke, and closed at the downward. Suction, in the ordinary sense, is nothing more than the removal of atmospheric pressure from any interior space, so as to allow atmospheric pressure to act externally; thus when water is sucked up through a tube, the air is exhausted from the latter by the mouth, and then the pressure of the external air or the fluid forces it up through the tube.

SU'DOR AN'GLICUS (the English sweat: *Lat.*), in Medicine, an endemic fever, formerly known by the name of the *sweating sickness* of England. This disorder was thus named from its first appearing in this island; and acquired the title of *sudor*, from the patient suddenly breaking out into a profuse sweat, which formed its great characteristic feature. It was at first extremely fatal; it ultimately became less malignant, and finally disappeared. It carried off the patient in a few hours.

SUDORIF'ICS (*sudor*, sweat; and *facio*, I produce: *Lat.*), medicines which promote sweat or sensible perspiration.

SUE (*suivre*, to follow: *Fr.*), to institute legal process against a person; to prosecute in a civil action for the recovery of a real or supposed right; as to *sue* for debt or damages.

SUF'FERANCE (*sufferentia*, an enduring: *Lat.*), a term in Law applied to tenants; a tenant at *sufferance* being one that continues after his title ceases, without positive leave of the owner.

SUF'FRAGAN (*suffragor*, I support: *Lat.*), in ecclesiastical polity, a term of relation applied to a bishop, with respect to the archbishop who is his superior.

SUF'FRAGE (*suffragium: Lat.*), a vote given in deciding a controverted question, or in the choice of a man for an office or trust.

SUFFRU'TICOSE (*sub*, somewhat; and *fruticosus*, bushy: *Lat.*), in Botany, an epithet for plants which are woody at the base, but whose yearly branches decay; as sage, thyme, &c.

SUGAR, a compound of carbon, hydrogen, and oxygen, is produced by many animal and vegetable bodies. That which forms an article of commerce is the produce either of beet or of the sugar-cane; the latter, a plant which belongs to the order of grasses, cultivated in warm climates. It is the saccharum officinarum of botanists, which grows to the height of from five to seven feet. The stem of the mature plant is from one to two inches thick. It is coated with a layer of silicious matter, as in the bamboo, whilst the fibrous interior is saturated with the saccharine juice. The manufacture of sugar from the sugar-cane may be thus shortly sketched. The canes are taken, as soon as they are cut, to the mill, where they are subjected to great pressure between iron rollers. The juice thus expressed is boiled in open pans with lime, and the scum is carefully removed. It is then filtered and passed through animal charcoal in powder, previous to being concentrated. This process takes place either in open troughs heated by steam, or in vacuum pans where it is boiled in vessels from which the air has been exhausted. The concentration having proceeded to the proper extent, the sugar may be obtained separate from the liquid portion, or molasses, by the use of centrifugal machines, vessels with sides of wire-net through which the liquid is forced into an outer vessel when the machine is set in rapid revolution. On the concentrated hot juice having the consistency and granular appearance of thick oatmeal-porridge is placed in conical pots of earthenware. When it has cooled and solidified there appears a mass of sugar crystals with syrup amongst them. A plug is removed from the bottom of the vessel, and the syrup, in great part, drains away, leaving the sugar in the state known as Muscovado or raw moist sugar. There is still some syrup left behind, and some of this is removed by the process of claying, which consists in pouring a mixture of clay and water over the top of the pot to the depth of an inch or two. The water of the clay sinks gradually downwards through the porous mass of crystals, combining with the syrup, and carrying it off through the bottom of the pot. The sugar, after this treatment, is termed 'clayed.' It is the refiner's business to purify the sugars thus produced, and produce by delicate chemical and ingenious mechanical processes the white loaf sugar of which there is such a large consumption in this country. A large quantity of sugar is contained in the sap of the American maple (*Acer saccharinum*), and is obtained from it in many parts of North America; maple sugar being, in some places, the only kind which is used, particularly by those recently settled in the country. It is wholesome, and not disagreeable. The process of manufacturing it is very simple. The trees are bored obliquely from below upwards, at 18 or 20 inches above the ground, care being taken that the auger penetrates no more than half an inch into the alburnum, or white bark; as a greater discharge takes place at that depth than any other. The liquor is boiled, and the evaporation urged by an active fire, with careful skimming during the boiling; and the pot is continually replenished with more sap, till a large body has assumed a syrupy consistence. It is afterwards strained and boiled again over a very brisk fire, till it has acquired the requisite consistence for being poured into the troughs prepared to receive it. In 1859, 450,000 tons of sugar were consumed in the United Kingdom. It has been calculated that in England there is an annual average consumption of 32lbs. of sugar by each person, in France 10⅜lbs., in Ireland 6¼lbs., and in Italy only 2lbs.—Sugar is a *proximate* element of the vegetable kingdom, and is found in most ripe fruits, and many farinaceous roots. By fermentation sugar is converted into alcohol, and hence forms the basis of those substances which are used for making intoxicating liquors, as molasses, grapes, apples, malt, &c. Of all vegetable principles it is considered as the most wholesome and nutritious.

SUGAR-CANDY, sugar in the form of large crystals. If, when the sugar is boiled, ready for crushing, preparatory to being placed in the conical moulds [see SUGAR], instead of its being broken up with oars it is poured into pans, across which *threads* are strung, crystals will attach themselves to the threads; if these crystals are gradually dried, and then washed with lime-water to remove the molasses from their outer surface, the result is *sugar-candy*. During crystallization the sugar must be kept perfectly at rest, as on this depends the size and regularity of the crystals. It is used instead of loaf-sugar in India, China, &c.

SUIT (*suite*, a following: *Fr.*), in Law, an action or process for the recovery of a right or claim; an action at law, a proceeding by a rule in Chancery, a prosecution.

SUIT'OR (*last*), in Legal phraseology, one who attends a court to prosecute a demand of right in law, as a plaintiff, petitioner, or appellant.

SUL'CATE, or SUL'CATED (*sulcatus*, furrowed: *Lat.*), grooved or scored with deep broad channels.

SUL'PHATE OF COP'PER, in Chemistry, *Blue Vitriol*, a salt composed of sulphuric acid and oxide of copper. It is also a natural product, in the liquid form, of many copper mines, being the result of the infiltration of water over copper pyrites. It has a disagreeable metallic taste; and, when swallowed, it causes violent vomiting.

SUL'PHATE OF IRON. [See COPPERAS.]

SUL'PHATES, in Chemistry, salts formed by the union of sulphuric acid with different bases; as the sulphurate of soda, called *Glauber's salts*; the sulphate of magnesia, called *Epsom salts*; also the sulphate of copper, the sulphate of lime, the sulphate of zinc, &c.

SUL'PHIDE. [See SULPHURET.]

SUL'PHITES, in Chemistry, salts formed by the union of sulphurous acid with the different bases.

SUL'PHUR (*Lat.*), in Chemistry, *Brimstone*, a substance which is hard, brittle, and usually of a yellow colour, without any smell, unless rubbed or heated, and of a weak, though perceptible taste. It is a non-conductor of electricity; its specific gravity is 1·99. It melts at about 216°, becomes liquid at 250°, but viscid and of a deeper colour at 450°, and a little more fluid at 480°, its boiling point; it rises rapidly in vapour at 600°, and condenses in close vessels into *flowers of sulphur*, a fine powder consisting of minute crystals, the earthy substances and other impurities remaining behind. If precipitated from its alkaline solutions by hydrochloric acid it is in the form of a hydrate, sometimes termed *milk of sulphur*. It is obtained in commerce in the solid form, as *stick sulphur* or *cane brimstone*. Sulphur is dug out of the earth in various places where volcanic action is going on, particularly Italy and South America. It is one of the ingredients in the composition of gunpowder, and that which occasions it to take fire so readily. A prodigious quantity of sulphur is obtained from Solfatara, in Italy. This volcanic country everywhere exhibits marks of the agency of subterraneous fires; almost all the ground is bare, and white; and is everywhere sensibly warmer than the atmosphere in the greatest heat of summer. It is obtained in large quantities, thought not quite so pure, from *pyrites*, which is a combination of sulphur and iron.

SULPHU'RET, in Chemistry, a combination of sulphur with a metal: thus, *sulphuret of iron*, sulphuret of potassium. The sulphurets are now more usually termed *sulphides*.——*Sulphuret of iron*, a mineral composed of sulphur and iron, which is found in many parts of the world, and which is also called *pyrites* or fire-stone.

SULPHU'RIC ACID, in Chemistry, called also *oil of vitriol*, a very important acid, discovered about the end of the 15th century. It is obtained by burning a mixture of seven or eight parts of sulphur with one of nitrate of potash or soda. A current of air carries the products of combustion from the furnace into a large leaden chamber, the bottom of which is covered to a few inches in depth with water. The sulphurous and hyponitrous acid that pass into the chamber form with the vapour of water a crystalline solid, which, as soon as it falls into the water, is decomposed into sulphuric acid, that remains in solution, and nitric oxide, which ascends and unites with oxygen so as to again form hyponitrous acid; this, uniting with a new portion of sulphurous acid and the vapour of waters, again produces the crystalline solid, which falling into the water gives rise to a repetition of the same results. The oxygen of the atmosphere, therefore, indirectly changes the sulphurous into sulphuric acid, through the medium of nitric oxide. The weak acid, which, after some time, is found on the floor of the chamber, is concentrated first in leaden, and afterwards in platinum vessels. Sulphuric acid is a limpid, colourless fluid, having a spec. grav. of 1·8. It boils at 620°, and freezes at 15°. When diluted the temperature at which it freezes is different. It is highly caustic, and intensely acid. Its affinities are so strong that it expels all other acids, more or less perfectly, from their combinations. It absorbs water from the atmosphere, and when diluted with that fluid evolves great heat. It chars animal and vegetable substances with great rapidity. The strongest oil of vitriol of commerce contains one atom of the acid and one of water; the anhydrous acid consists of one atom of sulphur and three of oxygen. The presence of sulphuric acid, either free or in combination, is ascertained with great facility by a soluble salt of barytes, which, when it is present, even in minute quantities, throws down a white precipitate, the sulphate of barytes.

SUL'PHUROUS ACID, in Chemistry, the gas obtained by burning sulphur in atmospheric air or oxygen. Water absorbs 30 volumes of it. Its odour is suffocating; it bleaches straw, silk, wool, &c., and destroys the colour of violets, dahlias, &c. It extinguishes flame, and destroys animal life. The gas assumes the liquid form when subjected to a pressure of two atmospheres, or a temperature of 6°; and, when liquid, it evaporates with such rapidity as to freeze mercury.

SUL'TAN (*Arab.*), a title of royalty amongst Mohammedan nations. It signifies a despotic ruler. The Grand Sultan, or chief of the Turkish empire, is styled in his dominions the *Sultandin*, or protector of the faith, the *Padishah Islam*, or Emperor of Islamism, and the *Zil-Ullah*, or Shadow of God. The title of sultan was first assumed by Bayazid I., the chief of the Osmanlis, who reigned 1389-1403. The sultan as successor of the caliphs adds that title to his others, and since the Koran was supposed to be the treasure of divine and human laws, of which treasure the caliphs were depositaries, he is at once pontiff, legislator, and judge, the sacerdotal, regal, and judicial offices being united in his person. Although claiming to be absolute monarch he must govern in conformity with the principles of the Koran, and with the traditionary words called Sunna of the prophet; and he must also conform to the decision of the Ulema [which see], and to the Urfi or Kanun-name, the legislature established since the commencement of the empire.

SU'MACH (*Fr.*), the *Rhus coriaria* of botanists, nat. ord. *Anacardiaceæ*, a shrub of the south of Europe of considerable value, the powder of the leaves, peduncles, and young branches producing the *sumach* of commerce, much employed in tanning light-coloured leathers. In calico-printing, sumach affords, with a mordant of tin, a yellow colour; with acetate of iron, a gray or black; and with sulphate of zinc, a brownish-yellow. Both the leaves and seeds of the sumach are used in medicine as astringent and styptic.

SUM'MER (*sumer: Sax.*), one of the four seasons of the year; beginning, in the northern hemisphere, when the sun enters Cancer, about the 21st of June, and continuing for three months; during which time, the sun being north of the equator, renders this the hottest period of the year. In latitudes south of the equator just the opposite takes place, or, in other words, it is summer there when it is winter here. The summer quarter of meteorologists consists of June, July, and August.

SUM'MONS (*sub*, up; and *moneo*, I warn: *Lat.*), in Law, a warning or citation to appear in court; or a written notification signed by the proper officer, to be served on a person, warning him to appear in court at a day specified, to answer to the demand of the plaintiff.

SUMP, in Metallurgy, a round pit of stone, lined with clay, for receiving the metal on its first fusion.——In Mining, a pit sunk below the bottom of the mine.

SUMP'TUARY LAWS (*sumptuarius*, pertaining to expense: *Lat.*), those laws which in extreme cases, have occasionally been made to restrain or limit the expenses of citizens in apparel, food, furniture, &c. Sumptuary laws are abridgments of liberty, and of very difficult execution. Those of England were repealed by stat 1 Jac. I. c. 25.

SUN (*sonne: Ger.*), in Astronomy, the magnificent orb which, occupying the centre of our system, gives light and heat to all the planets. Its light constitutes the day, and the darkness which proceeds from its absence, or the shade of the earth, is the cause of night. This splendid luminary is 96,000,000 of miles distant from the earth; a canon ball travelling at a uniform velocity of 1600 feet in a second, would require ten years to reach it, from the earth Its diameter is 892,000 miles; its mass is 354,936 times that of the earth, and 800 times greater than the aggregate of the masses of all the planets and satellites; its density is about one-fourth that of the earth; a body which, at the earth's surface, would weigh one pound, would on that of the sun weigh 27 9lbs; and an ordinary man would be crushed to atoms by his own weight. The sun revolves on its axis in about 25 days; which is ascertained by means of the spots on his surface, and his equator is inclined to the ecliptic at an angle of about 7° 20′. The spots are subject to change, they banish, and reappear; one has been observed, covering an area of 1520 millions of square miles, that is, a space thirty times greater than the whole surface of the earth. There are several hypotheses regarding them, but none which is satisfactory. Some imagine that the luminous atmosphere of the sun is at a great distance from its mass; and that the calorific rays are so intercepted by clouds as to render it habitable, but there can be little doubt that a most intense heat prevails at its surface. It is also supposed that the heat and light constantly passing off may gradually diminish its bulk. It is highly probable that the sun has a proper motion in space, though some centuries of observation may be required to detect its laws. Astronomers have lately seen reason to think that the mean distance of the earth from the sun is not so great by four millions of miles as was formerly supposed. This distance is now put down at 91,328,000 miles. Various other numerical changes become necessary. Thus the circumference of the earth's orbit becomes 599,194,000 miles; and her mean hourly velocity 65,460 miles. The diameter of the sun is 850,100 miles. The numerical expressions for the distances, velocities, and dimensions of all the other planetary bodies will require corresponding correction. [See ASTRONOMY, PLANET, SOLAR SYSTEM, &c.]

SUN'DAY, the first day of the week, called also the *Lord's day*, in memory of the resurrection of Christ; and the *sabbath-day*, because substituted, in the Christian worship for the sabbath, or day of rest, in the old dispensation. This substitution was first decreed by Constantine the Great, A.D. 321, before whose time both the old and new sabbath were observed by Christians. [See SABBATH.]

SUN'-FLOWER, a plant of the genus *Helianthus*, so called from its turning to the sun. [See HELIANTHUS.]

SUN'-HEMP, a coarse fibre employed in India in the manufacture of rough bags. It is furnished by the *Crotolaria juncea*, a leguminous plant which grows from four to six feet high, and bears masses of laburnum-like flowers.

SU'PER (*Lat*), a prefix used in chemical technology, with many words, denoting an excess; as *super*sulphate of potash, in which there is an excess of sulphuric acid.

SUPERCAR'GO, a person in a merchant's ship appointed to manage the sales and superintend all the commercial concerns of the voyage.

SUPEREROGA'TION (*super*, besides; and *errogatio*, a giving out: *Lat.*), in Roman Catholic theology, a term applied to such works as a man does which exceed the measure of his duty. This doctrine is condemned by the Church of England, in her 14th article

SUPERFI'CIES (*Lat*), the *surface*, or exterior face of a thing; as the *superficies* of a plane, or of a sphere.

SUPER'LATIVE (*superlativus: Lat.*), in Grammar, the name usually given to the third or highest degree of comparison: formed in the Teutonic languages, by the addition of 'est'

SUPERNU'MERARY, in Military affairs, is an epithet for the officers and non-commissioned officers attached to a regiment for the purpose of supplying the places of such as fall in action, &c.

SUPERPOSI'TION (*superpono*, I place over: *Lat.*), in Geology, a lying or being situated upon or above something.

SUPERSCAPULA'RIS (*super*, above; and *scapula*, the shoulder blade: *Lat.*), in Anatomy, a muscle seated upon the scapula or shoulder-blade.

SUPERSE'DEAS (*Lat.*), in Law, a writ or command to suspend the powers of an officer in certain cases, to stay proceedings, and in certain cases to discharge prisoners.

SUPERSTRUC'TURE (*superstruo*, I build upon: *Lat.*), any kind of building raised on a foundation or basis; the word being used to distinguish what is erected on a wall or foundation, from the foundation itself.

SUPERTON'IC, in Music, the note next above the key-note.

SUPINA'TORS (*supino*, I put anything on its back: *Lat.*), in Anatomy, two muscles of the arm; the one called the *supinator longus*, the other the *supinator brevis*, both serving to turn the palm of the hand upwards.

SUP'PLEMENT (*supplementum*, a filling up: *Lat.*), in Literature, an addition made to a book or paper, by which it is rendered more full and complete.——*Supplement of an arc*, in Geometry, the number of degrees which it wants of being an entire semi-circle; as a *complement* signifies what an arc wants of being a quadrant.

SUPPORTERS (*supporto*, I carry: *Lat.*), in Heraldry, figures placed by the side of the shield, and appearing to support it. Thus the lion and unicorn are the supporters of the British sovereign's arms. In modern English Heraldry, the use of supporters is limited to Sovereigns and Princes of the blood royal, Peers of the Realm, Knights of the Bath, Knights Bannerets, Baronets of Nova Scotia, and such as receive a special license from the king. In case of marriage of two parties, both of whom are entitled to supporters, one of each may be borne.——*Supporters*, in Architecture, images which serve to bear up any part of a building in the place of a column.

SUPPURA'TION (*suppuratio*: *Lat.*), in Medicine, the process of generating purulent matter, or of forming pus, as in a wound or abscess. Also, the matter generated by suppuration.

SUPRALAPSA'RIAN, in Theology, one who maintains that God, antecedent to the fall of man, decreed the apostacy and all its consequences, determining to save some and condemn others, and that in all he does he considers his own glory only.

SUPREM'ACY (*supremitas*, the highest honour: *Lat.*), in English polity, the supreme and undivided authority of the sovereign over all persons and things in this realm, whether spiritual or temporal.——*Oath of supremacy*, in Great Britain, an oath which acknowledges the supremacy of the sovereign in spiritual affairs, and abjures the pretended supremacy of the pope.

SURBASE (*Fr.*), in Architecture, the upper base of a room, consisting of the cornice of the dado.

SURCIN'GLE (*supra*, above; and *cingulum*, a girdle: *Lat.*), the girdle with which clergymen bind their cassocks. Also a girth for horses.

SUR'CULUS. [See SUCKER.]

SURD (*surdus*, indistinct: *Lat.*), in Arithmetic and Algebra, a magnitude not expressible by rational numbers, thus the square root of 2. Surds cannot be expressed exactly by ordinary notations, and are represented by prefixing the radical sign as $\sqrt{8}$, the square root of 8: $\sqrt[3]{7}$, the cube root of 7, &c.; they are termed also, *irrational* or *incommensurable* quantities.

SU'RETY (*sureté*: *Fr.*), in Law, one who enters into a bond or recognizance to answer for another's appearance in court, for his payment of a debt, or for the performance of some act, and who, in case of the principal's failure, is compellable to pay the penalty, debt, or damages.

SURF, the swell of the sea which bursts upon the shore, or against any rock that lies near the surface of the sea. A *surge* is a great wave rolling above the general surface of the water.

SUR'GERY (corrupted from chirurgery: *cheir*, the hand; and *ergon*, a work: *Gr.*), that branch of medical science which is concerned with the cure of disease, or the prevention of the ill effects arising from injury to the human body by means of operations performed by hand assisted by suitable instruments.

SURMUL'LET, or Red Mullet, a marine fish. [See MULLET.]

SUR'NAME (*surnom*: *Fr.*), the family name; the name or appellation added to the baptismal or Christian name. Camden derives it from *sur*, as being added over or above the other, in a metaphorical sense only. The most ancient *surnames* were formed by adding the name of the father to that of the son, in which manner were produced several English *surnames*, ending with the word son; thus, *Thomas William's son*, makes *Thomas Williamson*. The feudal system introduced a second description of *surnames*, derived from the names of places: as Sutton, Acton, &c.; and these were originally written with the particle *de* or *of*; as Henry de Sutton. Many surnames have been adopted from occupations, *Miller*, *Cooper*, *Taylor*, &c.; and many from personal peculiarities, *Long*, *Tall*, *Short*, &c.

SURREBUT'TER, in Law, the answer of the plaintiff to the defendant's rebutter.

SURREJOIN'DER, in Law, a second defence, as the *replication* is the first, of the plaintiff's declaration in a cause: it is an answer to the rejoinder of the defendant.

SURREN'DER (*surrendre*, to yield: *old Fr.*), in Law, a deed testifying that the tenant for life or years of lands, &c. yields up his estate to him that has the immediate estate in remainder or reversion.

SUR'ROGATE (*surrogatus*, substituted: *Lat.*), in the Civil Law, a deputy, or person substituted for another. The word is most commonly used as the title of a bishop's chancellor.

SUR'TURBRAND, fossil wood, found in great abundance in Iceland. It extends through the whole of the north-western part of the island, and is evidently a subterranean forest, impregnated with bituminous matter, and compressed by the weight of superincumbent matter.

SURVEY'ING (*survoir*, to overlook: *old Fr.*), the art of measuring land, laying down its dimensions upon paper, and finding its content or area. It is of two kinds, *land surveying* and *marine surveying;* the former having generally in view the measure or contents of certain tracts of land, and the latter the position of beacons, towers, shoals, coasts, &c. Those extensive operations which have for their object the determination of the latitude and longitude of places, and the length of terrestrial arcs in different latitudes, also fall under the general term *surveying*, though they are frequently called *trigonometrical surveys*. The operations of the surveyor are carried on by means of various instruments, such as the theodolite, the chain, &c., and he requires an acquaintance with practical geometry, trigonometry, the methods of calculation, &c.

SUS (*Lat.*), in Zoology, a generic term for the animal which is well known by the name of the *hog*, which see.

SUSPEN'SION (*suspendo*, I interrupt

Lat.), temporary privation of power, authority, or rights, usually intended as a punishment. A military or naval officer's suspension takes place when he is put under arrest.——In Law, prevention or interruption of operation; as the *suspension* of the habeas corpus act.——SUSPENSION, in Rhetoric, a keeping of the hearer in doubt and in attentive expectation of what is to follow, or what is to be the inference or conclusion from the arguments or observations.——SUSPENSION BRIDGES. [See BRIDGE.]——SUSPENSION OF ARMS, a short truce agreed on by hostile armies, in order to bury the dead, make proposals for surrender, &c.——POINTS OF SUSPENSION, in Mechanics, those points in the axis or beam of a balance to which the weights are applied, or from which they are suspended.

SUTTEE' (*satee*, pure: *Sans.*), the act of sacrifice by which a Hindoo widow immolates herself on the funeral pile of her husband. Though none of the sacred books of the Hindoos absolutely command the *suttee*, they speak of it as highly meritorious, and the means of obtaining eternal beatitude. It is believed also to render the husband and his ancestors happy, and to purify him from all offences, even if he had killed a Brahmin. Since the year 1756, when the British power in India became firmly established, upwards of 70,000 Hindoo widows have thus been sacrificed. On one occasion twenty-eight widows of a rajah were burned with his body. The institution has been suppressed by the English.

SU'TURE (*sutura*, a seam: *Lat.*), in Anatomy, the union of bones by means of dentiform margins; as is the case with the bones of the skull.

SWAIN'MOTE, or SWEIN'MOTE, in Law, one of the old forest courts formerly held before the verderers, as judges, by the steward of the swainmote; the swains (*swein*, a countryman: *Sax.*) composing the jury.

SWAL'LOW. [See HIRUNDO, and SWIFT.]

SWAMP (*Sax.*), wet and spongy land in low situations, but not usually covered with water. It differs from a *bog* and a *marsh*, in producing trees and shrubs, while the latter produce only herbage, plants, and mosses.

SWAMP-ORE, in Mineralogy, an ore of iron found in swamps and morasses, the colour of which is a dark yellowish brown or gray. It is called also *bog-ore*, or indurated bog iron ore.

SWAN, the name given to some large aquatic birds belonging to the genus *Cygnus*. Four species of this genus are placed amongst British birds. The plumage is of a pure white colour, and its long arching neck gives it a noble appearance. In northern climates, the swans are the ornament of the rivers and lakes, over which they seem to preside, from the majesty, ease, and grace of their movements. They swim rapidly, and their flight is powerful and long continued; they live in society, attain a great age, and make their nests near the margin of the water, upon the ground. The wild or whistling swan (*C. ferus*) has a black bill. The tame or mute swan (*C. olor*) has an orange-coloured bill and has a projecting black callous tubercle or knob on the base of the upper mandible. The black swan (*Cygnus atratus*) has a plumage which is almost all of a deep black; and at the base of its upper mandible, near the nostrils, is a bifid protuberance, which is wanting in the female.

SWEDENBOR'GIANS, the followers of Swedenborg, a Swedish nobleman who died in 1772. His doctrines were founded on a presumed analogy between spiritual and natural things, and are full of mysticism. He considered Christ as the one God in whom is centred the Divine Trinity; he insisted on the necessity for keeping the divine commandments, in which is included the performance of every duty. The Swedenborgians have places of worship in London, &c., and are greatly increasing in America.

SWIETENIA, in Botany, a genus of plants. The principal species is the *Swietenia mahogoni*, the mahogany-tree, or native of Central America. [See MAHOGANY.]

SWIFT, the name given to birds of the genus CYPSELUS. They are closely allied to the swallows and martins, but these have one of the toes directed backwards, whereas the toes of the swift are all directed forwards. The common swift (*C. murarius*) builds under the eaves of houses, or in holes in steeples. It is in the habit of continuing on the wing in the rapid pursuit of insects for hours together.

SWIM'MING, the progressive motion of an animal body in water. A large proportion of the animal tribes are furnished with a greater or less capacity for swimming. Fishes are wholly adapted to it; amphibious creatures, as much, if not more, than to walking; web-footed birds pass a considerable part of their existence upon the surface of the water, and many of them occasionally make their way beneath it. The same may be said of innumerable species of insects; and all quadrupeds are at least capable of preserving their lives, if accident immerses them in this element, while some resort to it with peculiar readiness. Man alone is incapable of swimming, without learning to do so as an art. The reason of this peculiar inability of the human race is attributed to the construction of the body, and especially of the head, from which results a situation of the centre of gravity wholly different from that in quadrupeds. Of man, the head with respect to the body, and compared with the heads of other animals, as proportioned to their bodies, is singularly heavy; a quality occasioned by the larger quantity of flesh, bones, and brain with which it is furnished; and the absence of those sinuses or cavities which, like air-bladders, lighten that of other animals. The head of a man, therefore, sinks by its own gravity; and, thus exposing the body to fill with water, causes him to drown. Brutes, on the other hand, are able to keep their nostrils above water with facility, and, thus respiring freely, are, on the principles of statics, out of danger. From these observations it will follow, that the *art of swimming*, which can be acquired by exercise only, chiefly consists in keeping the head above water; and that the hands and feet are to be used as oars and helm, in guiding the course of the vessel. With proper management the human body is capable of floating, as its specific gravity is, in reality less than that of water. [See DROWNING.]

SWING. A ship at anchor is said to *swing* when she changes her position at the turn of the tide.

SWING'WHEEL, in Horology, the wheel which drives the pendulum. In a watch, or balance-clock, it is called the *crown-wheel*.

SWIV'EL, in Gunnery, a piece of artillery, fixed on a socket on the top of a ship's side, stem, or bow, or in her tops, in such a manner as to be turned in any direction. ——A strong link of iron used in mooring ships, and which permits the bridles to be turned round.

SWORD-FISH, the name given to some fishes belonging to the genera *Xiphias* and *Histiophorus*. Their snouts are armed with a long bony weapon, with which they attack other fishes. The common sword-fish (*Xiphias gladius*) inhabits the Atlantic and the Mediterranean, and attains the length of 14 or 15 feet. It has been known to drive its sword into a ship, and there leave it firmly embedded.

SYB'ARITE an inhabitant of Sybaris, formerly a town on the Gulph of Tarentin in Italy, whose inhabitants, having become enervated by slavery to sensual pleasures, were easily subdued by the Crotonians. The term is applied metaphorically to designate an effeminate voluptuary.

SYCEE SILVER (*se sze*, fine gloss silk: *Chin.*), a silver currency among the Chinese. It is formed into ingots, stamped with the mark of the office from which they are issued. They are of various weights, but generally amount to ten *taels* each.

SYC'ITE (*sukites*, like a fig: *Gr.*), or FIG-STONE, a name sometimes given to nodules of flint or pebbles which resemble a fig.

SYC'OMORE (*sukomoros*, the fig-mulberry, *Gr.*). The true sycomore is an eastern tree belonging to the fig tribe, the *Ficus sycomoros* of botanists. The name *sycamore* has been given to a species of maple grown in Britain, the *Acer pseudo-platanus* of botanists.

SYC'OPHANT (*sukophantēs*; from *sukon*, a fig; and *phaino*, I inform against: *Gr.*), an obsequious flatterer or parasite. This word was originally used to denote an informer against those who plundered sacred fig-trees, or exported figs contrary to law. Hence, in time it came to signify a tale-bearer or informer in general; thence a flatterer, deceiver, or parasite.

SYENITE in Geology, a plutonic rock resembling granite in external appearance, but composed of quartz, felspar, and hornblende. It derives its name from having been obtained at the ancient quarries of Syene in Egypt. When it loses its quartz it gradually passes into syenitic greenstone, a rock of the trap series.

SYL'LABLE (*sullabē*; from *sullambano*, I take together: *Gr.*), in Grammar, a combination of letters uttered by a single effort or impulse of the voice, as *can*; or a single letter, as *o* in *over*. At least one vowel or open sound is essential to the formation of a syllable.

SYL'LABUS (a list: *Lat.*; from *sullabos*: *Gr.*), an abstract, or compendium containing the heads of a discourse, &c.

SYLLEP'SIS (*sullēpsis*; from *sullambano*, I take together: *Gr.*), in Grammar, a figure by which we conceive the sense of words otherwise than the words import, and construe them according to the intention of the author. Also, where two nominative cases singular of different persons are joined to a verb: or substantives of different gender to the same adjective—as *Rex et Regina beati*, or the agreement of a verb or adjective, not with the word next to it, but with the most worthy: as 'Rex et Regina beati.'

SYL'LOGISM (*sullogismos*; from *sullogizomai*, I bring at once before the mind: *Gr.*), in Logic, an argument consisting of three propositions; the two first of which are called the *premises*, and the last the *conclusion*. Syllogisms are nothing more than our reasoning reduced to form and method: and every act of reasoning implies three several judgments, so every syllogism must include three distinct propositions. Thus, in the following syllogism:—'Every creature possessed of reason and liberty is accountable for his actions;' 'Man is a creature possessed of reason and liberty:' 'Therefore man is accountable for his actions.' These propositions are denominated the major, the minor, and the conclusion. ——An *analogical syllogism* founds the conclusion upon similitude; 'As the base is to the column, so is justice to the commonwealth; but if the base be withdrawn, the column is overturned; therefore if justice is taken away, the commonwealth is overturned.'——An *hypothetical syllogism* is one in which the conclusion is deduced from an hypothetical premiss, called the major, and a categorical premiss called the minor. A syllogism is either *conditional* or *disjunctive*; if conditional it is either *constructive* or *destructive*. A disjunctive may easily be reduced to a conditional syllogism. 'With a *categorical syllogism*, that is, one containing three categorical propositions—and all syllogisms can be reduced to such—if two of the terms agree with the same third term, they agree with one another; if one of the terms agrees with and another disagrees with, the same third term, the two first disagree with one another.' Every syllogism has three terms, the middle term, and two extremes—designated the major and minor terms. The subject of the conclusion is the *minor* term; its predicate, the *major term*; and that with which they are compared is the middle term. In the major premiss, the major term is compared with the middle; in the minor premiss the minor term is compared with the middle; and in the conclusions, the major and minor terms are compared together. The middle term must be distributed once at least in the premises—that is, it must be the subject of a universal, or the predicate of a negative proposition; otherwise the two extremes may be compared, not with the *same* thing, but with two *different* parts of the middle term. No term must be distributed in the conclusions which is not distributed in one of the premises; otherwise, the *whole* term would be employed in the conclusion, and a *part* of it only in the premiss, in which case the error is termed an *illicit process* of the major or minor premiss. Nothing can be inferred from *two negative* propositions. If one premiss is negative, the conclusion must be negative, because one of the extremes disagreeing with the middle term, they must disagree with one another.——The *mood* or *mode* of a syllogism is the designation of its propositions, according to the respective *quantities*, that is, whether universal or particular; and *qualities*, that is, whether affirmative or negative: A is used to represent a universal affirmative proposition, thus—'all men are mortal:' E, a universal negative, thus—'no man is always wise:' I, a particular affirmative, thus—'some men are revengeful:' and O, a particular negative, thus—'some men do not live to be old.' There may be sixty-four combinations of these letters, and therefore of the propositions which they represent; but many of the corresponding syllogisms err against some of the rules given above; and only eleven will be found to afford correct syllogisms.——The *figure* of a syllogism consists in the situation of the middle term, with reference to the major and minor terms. In the 1st figure, the middle term is the subject of the major premiss, and the predicate of the minor; in the 2nd figure, the middle term is the predicate of both premises; in the 3rd figure, it is the subject of both; and in the 4th figure, it is the predicate of the major, and the subject of the minor. Multiplying the moods by the figures, we obtain forty-four different syllogisms; but of these five in each figure would err against some of the rules given above; and of the remaining twenty-four, five are unnecessary, particular conclusions being inferred in them, from premises which would warrant universal. The remaining nineteen have been expressed by the following *mnemonic* lines.

Fig. 1.—4 Moods. *b*A*rb*A*r*A, *c*E*l*A*r*E*nt*, *d*A*r*II, *f*E*r*IO*que*, prioris.
Fig. 2.—4 Moods. *c*E*s*A*r*E, *c*A*m*E*str*E*s*, *f*E*st*I*n*O, *b*A*r*O*k*O, secundæ.
Fig. 3.—6 Moods. *tertia*, *d*A*r*A*pt*I, *d*I*s*A*m*I*s*, *d*A*t*I*s*I, *f*E*l*A*pt*O*n*, *b*O*k*A*rd*O, *f*E*r*I*s*O*n*, habet: quarta insuper addit.
Fig. 4.—5 Moods. *br*A*m*A*nt*I*p*, *c*A*m*E*n*E*s*, *d*I*m*A*r*I*s*, *f*E*s*A*p*O, *f*E*r*I*s*O*n*.

As examples we may select a syllogism in the first mood of the first figure. 'A. all men are animals: A. all animals are mortal: *ergo* (therefore: *Lat.*), A. all men are mortal.' And the last mood of the fourth figure, 'E. No good man is cruel: I. some cruel men are brave: therefore, O. some brave men are not good men.' Almost every argument, however disguised by the language, may be reduced to a mood in one of the first three figures. In *reducing* a syllogism, the premises may be *illatively converted*, or transposed [see ILLATIVE CONVERSION]. The major does not always precede the minor premises. 'John is a just man: just men pay their debts: therefore John pays his debts,' is a syllogism in *Barbara*, with the major premises following the minor.

SYM'BOL (*sumbolon*; from *sumballo*, I bring together: *Gr.*), a word of many meanings, though used at present with but one. The original signification was the making several things contribute to form one whole; thus creeds were termed *symbols*, being a collection of articles of faith. But the word is now used to express outward appearances, intended to indicate something: in which sense the Greeks called their standards symbols, and the early Christians, all rites, ceremonies, sacraments, &c.——*Symbol*, in Chemistry, an abbreviation of the name of all elementary body; thus *Ag* is written for silver (Argentum); *Pb* for lead (Plumbum).——In the Eucharist, the bread and wine are called by Protestants *symbols* of the body and blood of Christ.——*Symbolical books*, are such as contain the creeds and confessions of different churches.——*Symbolical philosophy*, is a philosophy expressed by hieroglyphics.

SYMPATHET'IC INK, the name given to any chemical composition which may be used as ink, but the writing will be invisible until the paper is warmed, or until it is washed over with some other liquid. Thus if the ink be a solution of sulphate of iron, the writing will not be perceived until it is washed with tincture of galls. Again, if we write with a solution of hydrochlorate of copper, nothing will be seen upon the paper until it is held to the fire. The writing will become invisible once more when the paper is cool.

SYM'PATHY (*sumpatheia*; from *sumpatheo*, I feel along with: *Gr.*), the feeling of being affected similarly to some other person. According to Adam Smith it is in sympathy that our moral sense takes its rise.——In Medicine, *sympathy*, or 'consent of parts,' signifies a correspondence of various parts of the body in similar sensations or affections; or an affection of the whole body or some part of it, in consequence of an injury or disease of another part.——A *sympathetic disease* is one which is produced by a remote cause, as when a fever follows a local injury. In this case, the word is opposed to *idiopathetic*; which denotes either an original disease, or that which is produced by a proximate cause.——In Anatomy, the term *sympathetic* is applied to two nerves (the great intercostal and the facial nerves) from the opinion that their communications are caused by sympathies.

SYM'PHONY (*sumphōnia*: *Gr.*), in Music, primarily signifies a consonance or harmony of sounds, agreeable to the ear, either vocal or instrumental, or both. It means, at present, a piece of concerted music composed of several parts. Mozart and Beethoven have written some fine compositions of this class.

SYM'PHYSIS (*sumphusis*, a growing together: *Gr.*), in Anatomy, an immovable union of bones.——In Surgery, a coalescence of a natural passage; also, the first intention of cure in a wound.

SYMPO'SIARCH (*sumposiarchos*; from *sumposion*, a drinking party; and *archo*, I govern: *Gr.*), among the ancients the director and manager of an entertainment. This office was sometimes performed by the person at whose expense the feast was provided; and sometimes by the person whom he thought fit to nominate. The feasts of the ancient Greeks were termed symposia; but those of the Romans *convivia* (*con*, along with; and *vivo*, I live: *Lat.*); and Cicero remarks that the Romans were much more happy than the Greeks in choosing a word to signify an entertainment; since their idea was founded on *mutual intercourse*; while that of the Greeks had reference to the mere animal gratification derived from *drinking*.

SYMP'TOM (*sumptōma*; from *sumpipto*, I fall in with: *Gr.*), in Medicine, any appearance in a disease which serves to indicate or point out its cause, approach, duration, event, &c. Particular symptoms which more uniformly accompany a morbid state of the body, and are characteristic of it, are called *pathogonomic* or *diagnostic* symptoms. In a strict sense, however, *symptom* means no more than the consequences of diseases, and of their causes, exclusive of the diseases and causes themselves.——A *symptomatic* disease is one which proceeds from some prior disorder; as a symptomatic fever, proceeding from local pain or local inflammation. It is opposed to *idiopathic*.

SYMPTOMATOL'OGY (*sumptōma*, a symptom; and *logos*, a discourse: *Gr.*), that part of the science of medicine which treats of the symptoms of diseases.

SYNÆ'RESIS (*sunairesis*; from *sunaireo*, I bring together: *Gr.*), in Grammar, the contraction of two syllables into one: by the formation of a diphthong, or by rendering one of them mute; as Atreides, for Atreides. It is also termed *crasis*.

SYN'AGOGUE (*sunagōgē*, literally, a bringing together: *Gr.*), the building appropriated to the religious worship of the Jews; or the congregation who assemble in it, for the performance of their religious rites. It is supposed that there was no synagogue until after the captivity of Babylon. The service of the synagogue consisted anciently, as at present, of prayers, reading, and exposition of the Scriptures, and preaching. The lessons from Scripture consisted of passages from Deuteronomy and Numbers, the law, and the prophets.

SYNALŒ'PHA (*sunaloiphē*, literally a melting together: *Gr.*), in Classical prosody, the running of the syllable of one line into the first syllable of the next. It is occasionally used in modern languages, even including our own.

SYNARTHRO'SIS (*sunarthrōsis*; from *sunarthroo*, I link together: *Gr.*), in Anatomy, a species of articulation, where there is only an obscure motion, as in the bones of the carpus and metacarpus, &c.; or where there is no motion at all, as in the sutures of the skull.

SYN'CHISIS (*sun*, together; and *chusis*, a pouring out: *Gr.*), in Rhetoric, a confused and disorderly placing of words in a sentence.

SYNCHONDRO'SIS (*sun*, with; and *chondros*, a cartilage: *Gr.*), in Anatomy, a species of *symphysis*; being the union of two bones by means of a cartilage: as in the vertebræ.

SYNCHORE'SIS (*sun*, along with; and *chōrēsis*, a holding: *Gr.*), in Rhetoric, a figure of speech in which an argument is scoffingly conceded, for the purpose of retorting it more pointedly.

SYN'CHRONISM (*sun*, along with; and *chronismos*, a duration: *Gr.*), in Chronology, concurrence of two or more events in time. ——*Synchronal*, simultaneous, or happening at the same time.

SYNCLI'NAL, in Geology. [See ANTICLINAL.]

SYN'COPATE (*next*), in a primary sense, to contract; as a word, by taking one or more letters or syllables from the middle. ——In Music, to prolong a note begun on the unaccented part of a bar, to the accented part of the next bar; or to connect the last note of a bar with the first of the following.

SYN'COPE (*sunkopē*, a cutting short: *Gr.*), in Grammar, an elision or retrenchment of a letter or syllable from the middle of a word.——In Medicine, a swooning, in which the patient continues without any sensible motion or respiration; accompanied with a suspension of the action of the brain and a temporary loss of sensation and volition.——In Music, the prolonging of a note, begun on the unaccented part of a bar, to the accented part of the next bar; or the division of a note introduced when two or more notes of one part answer to a single note of another. The word *syncopation* is, however, more frequently used in music.

SYN'CRISIS (*sun*, together; and *krisis*, a judgment: *Gr.*), in Rhetoric, a figure of speech in which opposite persons or things are compared.

SYNDES'MUS (*sundesmos*, literally that which binds together: *Gr.*), in Anatomy, a ligament for binding together the bones and other parts.——In Grammar, a *conjunction*.

SYN'DIC (*sundikos*, helping in a court of justice: *Gr.*), an officer invested with different powers in different countries; generally a kind of magistrate entrusted with the affairs of a city or community. The university of Cambridge has its *syndics*: and in Paris almost all the companies, the university, &c. have theirs. In France, the creditors of a bankrupt appoint syndics or directors from among themselves.

SYNEC'DOCHE (*sunekdochē*: *Gr.*), in Rhetoric, a figure or trope by which the whole of a thing is put for a part, or a part for the whole; as the genus for the species, or the species for the genus, &c.

SYNE'CHIA (*sunecheia*, an unbroken

connection: *Gr.*), in Medicine, a concretion of the iris of the eye with the cornea, or with the capsule of the crystalline lens.

SYNGENE'SIA (*sun*, along with; and *genesis*, a production: *Gr.*), the 19th class of the Linnæan system of plants, containing several orders, in which the stamens are united in a cylindrical form by the anthers. Such plants constitute the nat. ord. *Compositæ*.

SY'NOCHA (*sunochē*, a meeting: *Gr.*), in Medicine, a species of continued fever, attended with symptoms denoting general inflammation in the system.

SY'NOCHUS (same *deriv.*), in Medicine, a species of mixed fever, commencing with symptoms of synocha, and terminating in typhus.

SYN'OD (*sunodos*; from *sun*, together; and *odos*, a way—literally, a journeying together: *Gr.*), in Ecclesiastical affairs, a council or meeting to consult on matters of religion. In Scotland, a synod is composed of several adjoining presbyteries. The members are the ministers, and a ruling elder from each parish.——*Synod*, in Astronomy, a conjunction, or concourse of two or more stars or planets, in the same optical place of the heavens.——*Synodical month*, a lunar month; the period from one conjunction of the moon with the sun to another. This is called also a *lunation*, because in the course of it the moon exhibits all its phases.

SYN'ONYME, or **SYN'ONYM** (*sunōnimia*, a likeness of name: *Gr.*), a word having the same signification as some other word. We rarely find two words precisely *synonymous* in all situations; though many are sometimes synonymous, and at other times not so. Thus, when we speak of the large rolling swell of the sea, we may call it a *wave*, or a *billow*; but when we speak of the small swell of a pond, we may call it a *wave*, but not a *billow*.

SYNOP'SIS (a seeing all together: *Gr.*), a collection of things or parts so arranged as to exhibit the whole or the principal parts in a general view.

SYNO'VIA (*sun*, along with; and *oon*, an egg: *Gr.*), in Anatomy, the fluid which lubricates the articulations of the bones; and which is for that purpose secreted in the cavities of the joints. It is glairy, and somewhat resembles the white of an egg.

SYN'TAX (*suntaxis*, literally, a putting together in order: *Gr.*), that division of grammar which analyzes the dependence of parts of speech upon one another, and supplies rules for their mutual government. Syntax, as an art, may be divided into two branches: the one common to all languages, and by which words are made to agree in gender, number, case, person, and mood; the other peculiar to each language, and by which one mood is made to govern another, and the consequent variations effected: the first of these is called *concord*; the second *government*. It has been said that the first merit of language is intelligibility; its first grace, purity; and that every other excellence is subordinate. Syntax, then, especially deserves attention: as neither intelligibility nor purity of style can be found where the rules of syntax are violated.

SYN'THESIS (*sunthesis*, a putting together: *Gr.*), in Antiquity, a loose robe worn by the Romans at their meals.——In Chemistry, the uniting of elements into a compound: the opposite of *analysis*, which is the separation of a compound into its constituent parts.——In Logic, that process of reasoning in which we advance by a regular chain from principles before established or assumed, and propositions already proved, till we arrive at the conclusion. The *synthetical* is therefore opposed to the *analytical* method.

SY'PHERING, in Ship-building, the lapping the edge of one plank over the edge of another in constructing the bulkheads.

SYRIN'GA (*surinx*, a pipe: *Gr.*; from its branches constituting tubes, when the pith is removed), in Botany, a genus of plants, nat. ord. *Oleaceæ*, containing the lilacs. The species cultivated in this country are natives of Persia. The shrub to which the name syringa is popularly given is a species of *Philadelphus*, a native of the south of Europe.

SYRINGOT'OMY (*surinx*, a pipe; and *tomē*, a cutting: *Gr.*), in Surgery, the operation of cutting for the fistula.

SYSSARCO'SIS (*sussarkōsis*; from *sun*, with; and *sarx*, flesh: *Gr.*), in Anatomy, a species of union of bones in which one is united to another, by means of an intervening muscle.

SYS'TEM (*sustēma*, a complex whole: *Gr.*), in Science and Philosophy, a whole plan or scheme, consisting of many parts connected in such a manner as to create a chain of mutual dependencies; or a regular union of principles or parts forming one entire thing. Thus, we say, the planetary *system*, or the whole of the bodies supposed to belong to each other; a *system* of Botany, or that which comprehends the whole science of plants; a *system* of Philosophy, or a theory or doctrine which embraces the whole of philosophy.

SYS'TOLE (*sustolē*, a contracting: *Gr.*), in Anatomy, the contraction of the ventricles of the heart, for expelling the blood and carrying on the circulation; the opposite state to which is called the *Diastole*, or dilatation of the heart.——In Grammar, the shortening of a long syllable.

SYS'TYLE (*sun*, together; and *stulos*, a column: *Gr.*), in Architecture, the disposition of columns in a building near to each other, but not quite so much so, as in the *pycnostyle*; the intercolumniation being only two diameters of the column.

SYZY'GIA (*suzugia*, a yoking together: *Gr.*), in Grammar, the coupling different feet together, in Greek or Latin verse.

SYZ'YGY (same *deriv.*), in Astronomy, a term equally used for the conjunction and opposition of the moon and planets, with the sun.

T

T, the twentieth letter and sixteenth consonant in the English alphabet, is a *dental*, or *palato-dental*; and susceptible of numerous interchanges, both in ancient and modern languages. It is numbered among the mutes, and differs from *d* chiefly in its closeness, the strength with which the breath is emitted in pronouncing *t* being all that distinguishes them. Its natural sound is heard in *take, turn, bat, bolt, butter*. Its use is to modify the manner of uttering the vocal sound which precedes or follows it. When *t* is followed by *h*, as in *think* and *that*, the combination forms a distinct sound, which is almost peculiar to the English language, and for which we have no single character; these sounds differ, *think* being aspirated, and *that* being vocal. Another sound is also produced by its combination with *i*, the letters *ti* usually passing into the sound of *sh*, as in *nation, position, substantiate*, &c. In a few words, the combination *ti* has the sound of the English *ch*, as in *Christian*. As an abbreviation, T was used by the Romans for Titus, Tullius, &c.: as M. T. Cicero, Marcus *Tullius* Cicero. The Roman Tribunes indicated their assent to the decrees of the senate, by subscribing a T. We use it for *Theologiæ* &c.: as S. T. P. *Sacræ Theologiæ Professor* (Professor of Sacred Theology).——In Music, T signifies *tenor;* and *tace*, to indicate silence; it also stands for *trillo*, a shake; and in concertos and symphonies it is likewise the sign of *tutti*, a direction to the whole band to play after a solo.

TA'BARD, a kind of tunic, covering the body before and behind, reaching below the loins, but open at the sides, from the shoulders downwards; it was a usual article of dress in the middle ages: blazoned with coats of arms, it is the dress of the heralds at present.

TABASHEER' (*Persian*), a substance found in the joints of the bamboo, which is highly valued in the East Indies as a medicine; but, as it is pure silex, its utility is merely imaginary.

TAB'BY (*tabino: Ital.*), in Commerce, a thick kind of *taffeta*, watered or figured, by means of a calender, the iron or copper rolls of which are engraved. The parts engraved pressing upon the stuff occasion that inequality of the service by which the rays of light are differently reflected.——*Tabbying*, the passing of silk, mohair, or other stuffs under a calender, to give them a wavy appearance.

TABERDARS, the name of some of the scholars at Queen's College, Oxford.

TAB'ERNACLE (*tabernaculum*, a tent: *Lat.*), among the Jews, a kind of tent or movable building, placed in the middle of the camp, for the performance of religious worship, sacrifices, &c., during the wanderings of the Israelites in the wilderness; and made use of for the same purpose till the building of the temple of Jerusalem. It was of a rectangular figure, thirty cubits long, ten broad, and ten high.——*The Feast of Tabernacles*, a solemn festival of the Jews, observed after harvest, on the fifteenth day of the month Tisri; instituted to commemorate the goodness of God, who protected them in the wilderness.——*Tabernacle* is also used to signify the box in which the Host is kept on the altar in Roman Catholic churches; and for the niche or cabinet in which relics, images, &c., are preserved.

TA'BES (*Lat.*), in Medicine, a wasting of the body: emaciation: atrophy.

TABLE (*tabula: Lat.*), in Anatomy, a division of the cranium or skull.——In Arithmetic, any series of numbers, formed so as to expedite calculations, as the tables of weights and measures.——In Astronomy, computations of the motions and other phenomena of the heavenly bodies.——In the glass manufacture, a circular sheet of finished glass, usually about four feet in diameter, weighing 10 or 11lbs., twelve of which make a side or crate of glass.——In Heraldry, escutcheons containing nothing but the mere colour of the field, and not charged with any bearing, are called *tables d'attente*, tables of expectation, or *tabulæ rasæ*.——Among jewellers, a *table* diamond, or other precious stone, is that whose upper surface is quite flat, and only the sides cut in angles.——In Literature, a collection of heads or principal matters contained in a book, with references to the pages where each may be found; as, a *table* of contents.——In Mathematics, a system of numbers calculated for expediting astronomical, geometrical, and other operations: thus we say, *tables* of the Stars; *tables* of Sines, Tangents, and Secants; *tables* of Logarithms, &c.——In Religion, a division of the ten commandments; as, the first and second *tables*. The first table comprehends the laws regarding God, the second those regarding man.——*Table*, in perspective, the transparent or perspective plane.——Knights of the *round table*, a military order said to have been instituted by Arthur, the first king of the Britons, A.D. 516.——*Laws of the twelve tables*, the first set of laws of the Romans, so called, probably, because they were engraved on tables or plates of copper, to be exposed in the most public part of the forum.

TABLEAUX VIVANTS (living pictures: *Fr.*), groups of persons, so dressed and placed as to represent paintings, statuary, scenes described by poets, &c. They are usually thus managed; a frame is made of sufficient width, covered with gauze, behind which the persons stand in appropriate attitudes and costume: lamps being so placed as to reflect light on the group from above.

TABOO', a word used by the South Sea islanders to denote something consecrated, sacred, and forbidden to be touched, or set aside for particular uses and persons.

TAB'ULAR SPAR (*tabularis*, pertaining to thin plates: *Lat.*), a silicate of lime, of a grayish white colour, whose primary form is regarded as a doubly-oblique prism. Before the blowpipe it melts on the edges into a semi-transparent colourless enamel.

TACAMAHAC'A, or **TAC'AMAHAC** (*Ind.*), a resin of doubtful origin; brought from America in large oblong masses, wrapped in flag leaves; of a light brown colour, and an aromatic smell between that of lavender and musk.

TACK, the course of a ship with regard to the position of her sails; as the starboard *tack* or larboard *tack*: the wind, in the former case, being on the starboard, in the latter, on the larboard side.——*To tack*, to change the course of a ship by shifting the position of the sails from one side to the other.

TAC'KLE, the rigging, blocks, and other apparatus of a ship. Also a machine for raising and lowering heavy weights, consisting of a rope and blocks or pulleys.

TAC'TICS (*taktikos*, suited to arranging: *Gr.*), a term which, in its most extensive sense, relates to those evolutions, manœuvres and positions which constitute the main spring of military and naval finesse Tactics are the means by which discipline is made to support the operations of a campaign, and are studied for the purpose of training all the component parts according to one regular plan or system; by means of which, celerity, precision, and strength are combined, and the whole rendered effective

TADOR'NA, or **SHELDRAKE** [which see].

TAD'POLE (*tad*, a toad; and *pola*, a young one: *Sax*), a young frog, before it has assumed its adult form. [See FROG]

TÆ'NIA (*tainia*, literally a band. *Gr*), in Architecture, the lintel which separates the architrave from the frieze, in the Doric order——TÆNIA, in Natural History, the *Tape worm*, an intestinal worm infesting mammalia, reptiles, and fish. This genus of entozoa is usually found in the alimentary canal; generally at the upper part of it Tape worms are sometimes collected in great numbers, so as to occasion the most distressing disorders. Each individual is in reality a colony of several hundred in a single file. The *proglottis*, or so-called head, containing eggs which have been developed into embryos, detaches itself, and finding its way into the open fields, &c , bursts and scatters the embryos, each of which finds its way into the flesh of some animal, rendering it measled, and after being further developed, enters the body of some other animal which eats the measled meat raw, or badly cooked.

TAF'FRAIL, the upper rail of a ship's stern: being a curved piece of wood, generally ornamented with carved work.

TAL'BOT, in Sporting, a sort of hunting dog between a hound and a beagle; with a large snout, and long, round, pendulous ears. It is remarkable for the eagerness with which it finds out the haunts of game, and pursues it.

TAGLIACOTIAN OPERATION. That used for restoring the nose. Tagliacotius, a Venetian surgeon, who wrote upon it, in 1598, and proposed the formation of the new organ from a piece cut out of the shoulder or arm, is generally considered its inventor; but the operation seems to have been practised in India from the earliest times; and it was frequently employed by the Italians, but particularly the Romans—with whom the loss of the nose was often inflicted as a punishment. In modern times an artificial nose is formed with a triangular piece of skin, cut out of the forehead, and turned with its apex downwards, so as to adhere to the newly cut surface of the mutilated organ.

TALC, in Mineralogy, a well known species of magnesian earth, the colour of which is generally one of the shades of green. It consists of broad laminæ or plates; is soft and unctuous to the touch; has a shining lustre, and is often transparent. By the action of heat, the laminæ open a little, the fragment swells, and the extremities are, though with difficulty, fused into a white enamel. The Romans prepared a beautiful blue, by combining talc with the colouring fluid of particular kinds of testaceous animals. They employed it both for window lights and for the pavement of magnificent buildings; and it is still used in many parts of India and China, in windows, instead of glass. It is found in various parts of the world. In England, Northamptonshire is the district most peculiarly known for this production; and it is met with in the northern parts of Scotland

TAIL, or **FEE-TAIL** (*tailler*, to prune *Fr.*), in Law, an estate or fee limited to a person, and the heirs of his body, general or special, male or female; opposed to fee-simple [See FEE and ENTAIL.] The estate, provided the entail be not barred, reverts to the donor or reversioner, if the donee die without proper heirs,

TAL'ENT (*talanton*, literally, a thing weighed: *Gr*), among the Ancients, the name of a Grecian weight, of different amounts; but usually about half a hundred ——Also, a sum of money, the true value of which cannot well be ascertained: but it is known that it was different among different nations. Among the Hebrews, there was both a talent of gold and a talent of silver, the former was worth 5,475*l.*; the latter, 342*l.* 3*s.* 9*d* The Attic talent, that most commonly used by the Greeks, is supposed to have been worth 243*l.* 15*s.* The *greater* talent of the Romans was worth 99*l.* 6*s* 8*d.*; and the *less* 60*l.*, or as some say 75*l.* Their *great* talent was equivalent to 1,125*l.*

TA'LES, in Law; if, when proceeding to the trial of a cause by a special jury, there are not a sufficient number of special jurors present, either party may pray a *tales;* that is, may ask the judge to allow a sufficient number of qualified men, who happen to be present (tales de circumstantibus) to be joined with the jurors, so as to make up the number of twelve.

TAL'ISMAN, a word of Arabic origin, signifying a figure cast or cut in metal or stone; and made, with certain superstitious ceremonies, during some particular configuration of the heavens; as when planets are in conjunction; and supposed to have extraordinary influence in averting disease. But, in a more extensive sense, the word *talisman* is used to denote any object in nature or art, the presence of which checks the power of spirits or demons, and defends the wearer from their malice. The talisman seems to differ from the *armlet*, in the more extensive power attributed to it.

TAL'LOW, the suet of the ox and sheep, melted and strained, to separate it from the membrane. It is a most important article, in commerce. The drier the food on which the animals are fed, the more solid is the tallow; hence the Russian is the best; as the animals whence it is obtained are, in that country, fed for eight months of the year on dry fodder. It consists of carbon, hydrogen, and some oxygen. [See FAT.] Besides the large quantity of tallow produced in this country, we imported, in 1858, 1,235,789 cwt., the value of which was 3,042,381*l.*

TAL'LOW-TREE, the *Stillingia sebifera*, nat. ord. *Euphorbiaceæ*, a remarkable tree growing in great plenty in China; so called from its producing a substance like tallow, applicable to the same purposes. The tallow-tree is about the height of the cherry-tree; the foliage resembles the Lombardy poplar; and at the end of the season the leaves turn bright red. The fruit, which is enclosed by a kind of coat resembling that of a chestnut, is composed of three grains, of the size and form of a small nut. The capsules and seeds are crushed together and boiled; the fatty matter is skimmed as it rises, and condenses on cooling. The candles made of this substance are very white.

TAL'LY (*tailler*, to cut: *Fr.*), a mode of reckoning between buyers and sellers, which before the use of writing was almost universal, and which is even still partially used. The *tally* is a piece of wood on which notches or scores are cut as marks of number. It is customary for traders to have two of these sticks, or one stick cleft into two parts, and to mark or notch them in a corresponding manner; one to be kept by the seller, the other by the purchaser.——In the English exchequer, tallies have been abolished, and the old ones have been destroyed.

TAL'LY TRADE, the name given to a system of retail trade, by which shopkeepers furnish certain articles on credit to their customers, the latter agreeing to pay a stipulated sum weekly.

TAL'MUD (*lamad*, he taught: *Heb.*), the interpretations of the Law of Moses, given by the Rabbins, and valued by many of the Jews even more than the Law itself. There are only two Talmuds, those of Jerusalem and Babylon; the former printed in one volume folio, and the latter in fourteen. The works of Jonathan and Onkelos are to be considered as paraphrases rather than interpretations. The Talmud of Jerusalem consists of two parts, the *Mishna* (a reiteration: *Heb.*), drawn up by Rabbi Juda Hakkadosh, 120 years after the destruction of the Temple of Jerusalem: and the *Gemara* (a finishing: *Chald.*), the work of Rabbi Johanan, the rector of a school at Tiberias about 100 years later. The Mishna is more correct than the Gemara, which is filled with dreams and foolish disputations. The Talmud of Babylon, which is of higher authority among the Jews than that of Jerusalem, was composed by Rabbi Aser, who kept an academy for 40 years at Sara near Babylon; he did not live to finish it, but it was completed by his disciples about 500 years after Christ. Enormous quantities of Talmudic works were committed to the flames by popes Gregory IX., Paul IV., and Clement VIII., under pretence of their being erroneous productions.

TAL'ON, in Architecture, a kind of moulding, which consists of a cymatium, crowned with a square fillet. It is concave at the bottom, and convex at the top: and is usually called by workmen an *ogee*, or O G.

TAL'PA (a mole: *Lat.*), in Surgery, a tumour under the skin or cuticle, usually called a mole.——In Zoology, the *Mole*, which see.

TA'LUS (*Lat.*), in Anatomy, the *astragalus*, one of the bones of the ankle.——In Geology, the accumulation of fragments at the foot of a steep rock, more or less filling up the angle.——In Fortification, the slope of a work, as that of a bastion, rampart, or parapet.

TAM'ARIND (*tamar-hindy*, Indian date: *Arab.*), large leguminous trees, growing in the East and West Indies, from the pods of which is obtained a well-known subacid confection.

TAM'BOUR (a drum: *Fr.*), a species of embroidery wrought on a kind of cushion or spherical body, stretched on a frame, so that it somewhat resembles the head of a drum, or a tambourine. A frame of a different construction is used when several workers are employed on the same fabric; it consists principally of two rollers, which, when properly fixed, stretch the material to the necessary degree of tension. But machines of extraordinary ingenuity have of late years been constructed for tambour-working, by which the greatest accuracy is ensured, while the saving of manual labour places them among those efforts of mechanical skill which are the distinguishing features of the present age.——*Tambour*, in Architecture, the wall of a circular building, surrounded with columns.——In Mechanics, the cylindrical axle-tree of a wheel, which serves to draw up stones out of a quarry.——*Tambour*, in Fortification, a kind of work formed of palisades or pieces of wood ten feet long, planted close together, and driven firm into the ground.

TAMBOURI'NE (*tambourin: Fr.*), one of the most ancient musical instruments. It is still used in the Basque provinces, where a large kind, called *tambour de Basque*, is played as an accompaniment to all the national songs and dances. In Scripture, this instrument is designated a *timbrel;* in profane history we find it was popular among most of the Eastern nations; and in the middle ages it was used by the Troubadours and minstrels. The present tambourine consists of a wooden or brazen hoop, over which a skin is extended, and which is hung with a kind of bells. Sometimes the thumb of the right hand is drawn in a circle over the skin; sometimes the fingers are struck against it; while it is supported by the thumb of the left hand.

TAM'POE, an East Indian fruit somewhat resembling an apple.

TAN (*tann*, the oak: *Armor.*), the bark of the oak, or other tree ground or chopped; and used in tanning leather. Tan after having been employed in tanning, is used in gardening, for making hotbeds.

TAN'GENT (*tangens*, touching: *Lat.*), in Geometry, a straight line which touches a curve, but which, when produced, does not cut it.——In Trigonometry, the tangent of an arc is a right line touching the arc at one extremity, and terminated by a secant, or radius produced, passing through the other extremity.

TAN'ISTRY, an old tenure of lands in Ireland, &c., by which the proprietor had only a life estate, and the inheritance descended to the oldest or most worthy of the blood and name of the deceased; but the practice often gave rise to the fiercest and most sanguinary contests between tribes and families.

TANNIC ACID, in Chemistry, a substance obtained by acting with ethers upon bruised galls. It is a white amorphous powder, scarcely soluble in water, which reddens litmus paper. When moistened and exposed to the air it becomes *gallic acid* by the absorption of oxygen. It is a compound of carbon, hydrogen, and oxygen. It is very astringent, and seems to be the active principle of tanning substances in general.

TAN'NIN, in Chemistry, the pure astringent principle of vegetables; and that which gives them the power of changing skin into leather. It may be obtained by adding acetate of copper to filtered infusion of galls, and wasting the precipitate: then diffusing it through water, and decomposing it by sulphuretted hydrogen; a pale yellow extract, of a strong astringent taste, is obtained by evaporating the solution: this is *tannin*. It produces a dense white precipitate in a strong solution of an animal jelly, isinglass for example. The tannin of galls, bark, grape-seeds, &c., precipitates the persalts of iron blue or black; that of catechu and tea precipitates them green. The skin of an animal when freed from the hair, epidermis, and cellular fibre, consists chiefly of indurated gelatine. By immersion in the tan-liquor, which is an infusion of bark, the combination of tannin with the organized gelatine, which forms the animal fibre, is slowly established; and the compound of tannin and gelatine not being soluble in water, and not liable to putrefaction, the skin is rendered dense and impermeable, and not subject to the spontaneous change which it would otherwise soon undergo.

TAN'NING, the art or process of preparing leather from the raw hides of animals, by means of tan. After being cleared of the hair, wool, and fleshy parts by the help of lime, scraping, and other means, the hides are macerated in an astringent liquor, formed from the bark of the oak. This is usually done by putting into the tan-pit layers of ground oak-bark and skins alternately, with the addition of a small quantity of water. The process is long and laborious: requiring from seven to twelve months; and, in the case of buffalo hides, eighteen, or even twenty-four. But it has been greatly accelerated by carrying it on *in vacuo;* the air being rarified, the pores of the skins are opened, and more readily absorb the tanning principle; also the tannic acid is not so easily changed in gallic, which is an advantage. If the skins are kept in motion they are tanned *in vacuo* in from four to forty days; the latter being sufficient for the best ox-hides, which by the old process would require probably twelve months, or about nine times as long; but some believe the best leather to be produced by the old mode of manufacture.

TAN'SY the *Tanacetum vulgare* of botanists; a British wild plant of the nat. ord. *Compositæ*. It has small yellow flowers, like buttons, disposed in a large upright corymb. The whole plant has a strong and penetrating odour, and an extremely bitter taste. It contains an acrid volatile oil, and is used in medicine as a stimulant and carminative.

TAN'TALITE, in Mineralogy, the ferruginous oxide of columbium, called also *columbite*. It is found in small masses, and octohedral crystals, in Finland and the United States.

TAP'ESTRY (*tapisserie: Fr.*), a curious production of the loom, in which the finest pictures may be represented. It consists of a kind of woven hangings of wool and silk, often enriched with gold and silver, representing figures of men, animals, landscapes, historical subjects, &c. This species of covering for walls was known among Eastern nations from a very remote era; but it is supposed that the English and Flemish, who were the first that, in the northern parts of the world, excelled in this art, learned it from the Saracens during the crusades. During the 15th and 16th centuries the art was practised with great skill at Arras, in Flanders; and tapestries were executed there after the masterly designs of Raphael, termed his *cartoons*. These were originally thirteen in number; and seven of them are in the South Kensington Museum, London. Copies of them, in tapestry, were executed by order of Leo X., and cost 7,000 crowns in gold. The manufacture was carried on in England, and much patronized; but this kind of decoration has long since given place to paper, &c. Colbert, the celebrated minister of Louis XIV., established *Gobelin's* celebrated manufactory of tapestry, in the neighbourhood of Paris. [See GOBELINS.]

TAPIO'CA. [See MANIOC and CASSADA.]

TA'PIR, in Zoology, a genus of pachydermatous quadrupeds, of which there are three existing, and several extinct species. They have a short proboscis, four toes on the fore foot, and three on the hind foot. One species inhabits Sumatra, Malacca, and some of the surrounding countries. The two other species are natives of South America. The *Tapir Americanus* is about six feet long and upwards of three feet high It shuns the habitations of man, and leads a solitary life in the interior of forests, living on fruits and the young branches of trees. When domesticated, it eats every kind of food. Though possessed of great strength, it uses it only for defence; and its disposition is mild and timid.

TAR, a dark-brown viscid liquid, obtained by the destructive distillation of wood of the fir-tree; it consists of resin, empyreumatic oil, and acetic acid; and is converted into pitch by boiling. Six different substances have been obtained from it, *paraffine*, *eupion*, *creasote*, *picamar*, *capnomar*, and *pittacal*. The more liquid species of bitumen are also called *mineral tar*.

TARAN'TULA (from *Tarentum*, in Italy), the *Lycosa tarantula*, the largest of European spiders, the bite of which produces symptoms formerly supposed to be curable only by music. The name of the *tarantella*, the national dance of Sicily, is derived from it.

TARE, in Commerce, an allowance for the outside package, that contains such goods as cannot be unpacked without detriment; or for paper, bands, cord, &c. When the tare is deducted, the remainder is called the *net* or *neat* weight.

TAR'GUM (*Heb.*), a name given by the Jews to certain glosses and paraphrases of the Scriptures, composed in the Chaldaic language. The two principal Targums on the greater and lesser prophets, except Daniel, Ezra, and Nehemiah, were written by Jonathan, or rather Pseudo-Jonathan, about thirty years before Christ; that of Onkelos, on the Pentateuch, is supposed to have been written in the first century of our era. There are eight others: two of which are considered of great antiquity.

TAR'IFF, or TAR'IF (*tarif: Fr.*), in Commerce, a list or table of custom-house and excise duties imposed on goods, with their respective rates.

TARPE'IAN, in Roman Antiquity, an appellation given to a steep rock in Rome; whence, by the law of the twelve tables, those guilty of certain crimes were precipitated. It was named after Tarpeia, the daughter of Tarpeius, the governor of the citadel of Rome, who, as the tradition runs, promised to open the gates of the city to the Sabines, provided they gave her their gold bracelets, or, as she expressed it, what they carried on their left hands. The Sabines consented, and, as they entered the gates, threw not only their bracelets, but their shields, upon Tarpeia, who was crushed under the weight. It has been much reduced in height by the ruins which have accumulated for ages at its base.

TAR'RASS, or TER'RAS, in Mineralogy, a volcanic earth, resembling puzzolana, used as a cement. The Dutch tarras is made of a soft rock stone found near Collen, on the lower part of the Rhine. It is burnt like lime, and reduced to powder by being ground.

TAR'SUS (*tarsos*, the flat of the foot: *Gr.*), in Anatomy, a part of the human foot, the front of which is called the instep. There are seven bones in two rows.——In Birds, the term is sometimes applied to the third segment of the leg, which is seldom covered with flesh or feathers; it corresponds with the tarsus and metatarsus conjoined.——In Insects, it is the collection of minute joints, which make up the fifth principal segment of the leg or foot. *Tarsus* is also used by some for the cartilages which terminate the *palpebræ*, or eyelids, and from which the *cilia* or hairs arise.

TAR'TAR, an impure tartrate of potash deposited by grape juice in the act of fermentation. In its crude state, it is much used as a flux in the assaying of ores. When purified it is called Cream of Tartar. [See ALGOL.]

TAR'TAR EMETIC, in Chemistry, a double salt, consisting of tartaric acid combined with potash and protoxide of antimony.

TARTAR'IC ACID, in Chemistry, an acid composed of carbon, hydrogen, and oxygen, which exists in grapes, pine apples, and other fruits. The acid of commerce is prepared from *tartar* or *algol*.

TAR'TARUS (*Lat.*), a region of hell, where the Greeks and Romans supposed the most wicked of men were punished after death. A dark cloud concealed the entrance, a brazen wall surrounded it, or, according to Virgil, three walls and the burning river Phlegethon. It was here that the great criminals of mythology Ixion, Tityus, the daughters of Danaus, Tantalus, Sisyphus, and others, underwent their punishment.

TAR'TRATES, salts formed by the combination of tartaric acid with different bases; as *tartrate* of potash, *tartrate* of soda, &c.

TASTE, in Physiology, one of the five senses; a peculiar sensation excited by means of the nervous papillæ of the tongue. ——*Taste* is also used, in a figurative sense, for the judgment and discernment of the mind, regarding what is grand and beautiful both in art and nature. Taste is, in some degree, the fruit of observation and reflection—not wholly the gift of nature, nor wholly the effect of art.

TATTOO' (*tapotez tous*, tap, all of you: *Fr.*), the beat of the evening drum, giving notice to soldiers to repair to their quarters in garrison, or to their tents in camp.

TATTOO'ING, a mode of marking the skin of the face, back, breast, arms, and legs, with ineradicable stains arranged in curved or straight lines, adopted by the South Sea Islanders, the New Zealanders, and the Red Men of tropical America. A pointed instrument is employed to perforate the skin, and then the colouring matter is applied.

TAUROBO'LIUM (*tauros*, a bull; *bollo*, I slaughter: *Gr.*), an altar whereon a bull was solemnly sacrificed to Cybele, the mother of the gods, out of gratitude for the preservation of the Emperor of Rome. It usually consisted of a cubical block of stone surmounted by a cornice and ornamented with sculptures, amongst which a bull's head often appeared. These altars are frequently exhumed in countries occupied by the Romans.

TAU'RUS (*Lat.*), in Astronomy, the *Bull*, the second of the twelve zodiacal constellations and signs. It contains several very remarkable stars, *Aldebaran*, of the first magnitude in the eye, the cluster, called the *Pleiades*, in the neck, and the *Hyades*, in the face.

TAUTOCHRONE (*tauto*, just the same; and *chronos*, time: *Gr.*), in Mechanics, the curve upon which a heavy body, acted upon by gravity, will descend so as to arrive at the lowest point in the same time from whatever point it begins to move. Huygens showed that, in a vacuum, the curve is a cycloid. Gravity being supposed to act in parallel straight lines, Newton showed it to be a cycloid in a resisting medium also, when the resistance is proportional to the *velocity;* and Euler determined its nature when the resistance is proportional to the *square of the velocity*.

TAWING, the preparation of white leather, by impregnating skins with saline, oily, and other matters; it differs from tanning, in which they are combined with astringent principles. [See TANNING.]

TAXES (*taxo*, I estimate: *Lat.*), the assessments imposed by Law for the public service: either *direct*, as on persons and necessaries; or *indirect*, as on luxuries and raw materials. Taxes imposed on goods at the time of their importation, are denominated *customs*, *duties*, or *imposts*. In imposing taxes, a government should keep certain great principles in view.—The subjects of a state should contribute to its support, and in proportion to their respective abilities. The amount of a tax and the time of payment should not be arbitrary, but fixed and well known. Every tax should be levied at the time, and in the manner, likely to be most convenient to him who pays it; and it should be collected at as small an expense as possible. Taxes on commodities are either *external*, that is, paid on the frontier; or *internal*, that is, excise duties. *Land tax* is another source of revenue: *stamp duties* and assessed taxes are others. In Great Britain, the taxes are almost entirely collected by government officers, paid by regular salaries. In 1858, the revenue was 60,850,060*l.*, or about 41*s.* 2*d.* per head: namely, customs, 24,155,852*l.*; excise, 18,480,572*l.*; stamps, 8,247,342*l.*; and assessed taxes, including income tax, 9,975,294*l.*: being, on account of the Russian war, about nine millions in excess of the average revenue for the preceding ten years. To this must be added about 15,000,000*l.* for poor rates and other local taxations; the real property in Great Britain and Ireland being estimated at 3,200,000,000*l.*; and the personal, at 2,775,000,000*l.*

TAX'IDERMY (*taxis*, an arranging; and *derma*, the skin: *Gr.*), the art of preparing and preserving specimens of animals.

TAX'IS (an arranging: *Gr.*), in Surgery, an operation by which those parts which have left their natural situation are replaced by the hand, without the assistance of instruments; as in reducing hernia, &c.

TEA, the dried leaves of Chinese shrubs belonging to the genus *Thea*, nat. ord. *Ternstrœmiaceæ*. They are natives of China, Japan, and Tonquin, flourishing most in valleys, the sloping sides of mountains, and the banks of rivers exposed to the southern rays of the sun. There are two species of the tea plant, *Thea viridis*, with broad leaves, and *Thea bohea:* the former being considered by some as the source of green, and the latter of black tea. There is also a variety, termed *Thea Assamensis*, which seems to resemble both the others. The names given in commerce to the different sorts of tea are unknown to the Chinese, the imperial excepted, and are supposed to have been applied by the merchants of Canton. The black teas are, Bohea, Congou, Campoi, Souchong, Caper, and Pekoe; the green teas are Twankay, Hyson skin, young Hyson, Hyson, Imperial, and Gunpowder. The quality of tea depends very much on the season in which the leaves are picked, the mode in which it is prepared, and the district in which it grows. Green tea is said to owe its colour to an extract of indigo, to Prussian blue, and gypsum; and the *flowering kinds* their rich tint to the leaves of the *Olea fragrans* and other plants. The most remarkable substances in teas are tannin, an essential oil to which it owes its aroma, and an alkaloid named *theine*. 100 parts of dried tea contain, on an average, about 6 parts nitrogen; the largest amount, by far, that has been detected in any vegetable. Tea, taken in moderation, is beneficial to the body; but in most constitutions, if taken in excess, it produces considerable excitement and wakefulness. Tea and coffee owe their energy to two substances, *Theine* and *Caffeine*, which differ in name, but are identical in nature. The tea plant is the growth of a particular region, situated between the 30th and 33rd degrees of north latitude. The trees are planted four or five feet asunder; they have a very stunted appearance, and are not allowed to grow higher than is convenient for men, women, and children to pick the leaves. When this is done, the leaves are put into wide shallow baskets, and placed on shelves in the air, wind, or mild sunshine, from morning till noon. They are then placed on a flat cast-iron pan over a charcoal stove, ten or twelve ounces being thrown on at a time, and kept stirred quickly with a hand-broom. After this, they are brushed off again into the baskets, in which they are equally and carefully rubbed between men's hands to roll them; and then are again dried over a slower fire. The tea is next laid upon a table to be drawn or picked over. The smallest leaves are called by the Chinese *Pha-ho;* the second, *Pow-chong;* the third, *Su chong;* and the fourth, or largest, *Tay-chong*. In 1863, tea to the amount of 136,806,319 *lbs.* was imported, of the value of 10,666,017*l.*, and of this 85,206,769 *lbs.* were entered for home consumption.

TEAK'-TREE, the *Tectona grandis*, one of the largest trees known, although it belongs to the same order as the lowly verbenas of our gardens; it may be regarded as the oak of the Eastern world, and the only Indian wood impenetrable by white ants. It is, in many respects, superior to oak; without fear of dry or wet rot, it may be used almost green from the forest; it is capable of enduring all climates, and all alternations of climate. It is strong, light, and easily wrought at all ages; and is much used in building ships as well as houses. This tree abounds in the extensive forests of Java, Ceylon, Malabar, Coromandel, &c., but especially in the empires of Birmah and Pegu, from which countries Calcutta and Madras draw all their supplies of ship timber. The teak of Malabar, produced on the high table-land, to the south of India, is deemed the best. There is a species of timber, called African teak, largely imported into England; but it belongs to the order of *Euphorbiaceæ*, and it is destitute of several of the most valuable properties of the true teak.

TEARS, the limpid fluid secreted by glands adjoining the eye, and increased by emotions of the mind, but more especially by grief. This fluid is also called forth by any injury done to the eye. It consists of about one per cent. solid matter; composed of common salt with traces of phosphate of soda, and albumen. This fluid serves to moisten the cornea and preserve its transparency, as well as to remove any dust or other substance that enters the eye. The lachrymal glands are the organs which secrete this liquid; one of them is situated in the external canthus of each orbit, and emits six or seven excretory ducts, that open on the internal surface of the upper eyelid, and pour forth the tears.

TECHNOL'OGY (*technē*, an art, and *logos*, a discourse: *Gr.*), a treatise on the arts; or an explanation of the terms of the arts. A *technical* word is a word that belongs properly or exclusively to the arts.

TE DE'UM, the title of a celebrated hymn used in the Christian church, and so called because it begins with the words, *Te deum laudamus*; We praise thee, O God. It is sung in the Roman Catholic churches with great pomp and solemnity, on occasions of joyful thanksgiving.

TEETH, the bony organs with which vertebrate animals seize or prepare their food. In the higher mammals, a tooth is composed of three tissues, viz. DENTINE, which forms the body of the tooth; *cement*, which forms the outer crust; and *enamel*, which is placed between the dentine and the cement. The cement resembles in texture the bones of the same animal, and in adult man it is confined to the outer part of the fangs. The enamel is the hardest of the dental tissues, and, like the others, consists of earthy matters deposited in minute cells. The typical number of teeth in the mammalia is 44 (the hog for example having this number), but the average one of that class is 32, as we find in man, the old world apes, and the true ruminants. In each of the jaws of the adult man are four cutting teeth, or *incisors*, in front, followed on each side by one canine tooth and five grinding teeth, or *molars*, of which the two next the canine tooth are termed *premolars*. All the teeth except the true molars are shed early in life, and are replaced by others which grow up from beneath them. The first set of teeth are denominated temporary deciduous or milk teeth. The method adopted by anatomists for expressing the number and kind of the teeth, may be thus illustrated by the dental formula of man:

$$i\,\frac{2-2}{2-2}\quad c\,\frac{1-1}{1-1}\quad p\,\frac{2-2}{2-2}\quad m\,\frac{3-3}{3-3}=32$$

where the letters indicate the names of the teeth as given above, and the numbers above and below the lines respectively indicate the teeth in the upper and lower jaws, whilst the short lines separating the figures serve to point out the different sides of the jaws. The teeth of different animals vary greatly in shape according to the uses to which they are applied. Take the molar teeth, for example. Amongst the true carnivora they are compressed laterally, and have sharp cutting edges, which shut like the blades of scissors, one set over the other. By this structure these animals are able to divide their food with great facility. The insectivora, such as the mole and bat, have molars terminated by several sharp points. Herbivorous animals have the summits of their molars flat with prominent ridges, a structure that enables them to crush and triturate their food. An omnivorous animal like man has several rounded tubercles on the grinding surfaces. From this variety in the shapes of teeth, and the constancy of their correspondence with the structure of the body, it happens that a single molar will always indicate the group to which any animal belongs.

TEETH OF WHEELS, those prominent portions in the peripheries of wheels which, locking in each other, convey the power of a prime mover to the working parts of machinery. They should be of such a shape as to roll and not slide on each other, should have such a curvature as that the angular velocities of the two pieces working together shall preserve the same constant ratio, in all positions of contact. To secure this condition it is necessary that the acting faces of the teeth shall have such a shape that the normal common to the two surfaces in contact, shall always divide the *line of centres* in a fixed point. Many forms would effect this, but a few only are actually employed.

TEE-TOTALLERS. [See TEMPERANCE SOCIETIES.]

TEL'EGRAPH (*tēle*, far off; and *grapho*, I write: *Gr.*), a machine for communicating intelligence to a great distance, by various signals or movements previously arranged. The conveyance of information by signals was practised from the earliest ages; but a telegraph universally applicable was first described by Hooke in 1684; it was not, however, put into practice, nor was telegraphic communication applied to any useful purpose until 1794, when it was used to convey intelligence to the French armies. The method consisted in a beam, which turned on a pivot in the top of an upright post, having a movable arm at each of its extremities; and each different position, in which the beam and its two arms could be placed at angles of 45°, afforded a separate signal, which might represent a letter of the alphabet, or anything else agreed upon. Many modifications of the telegraph were invented successively in this country, &c., but they have all been superseded by that admirable contrivance, the electric telegraph, which see.

TEL'ESCOPE (*tēle*, far off; and *scopeo*, I view: *Gr.*), an optical instrument employed in viewing distant objects. It assists the eye chiefly in two ways; first, by enlarging the visual angle under which a distant object is seen, and thus magnifying that object; and, secondly, by collecting and conveying to the eye a larger beam of light than would enter the naked organ, and thus rendering objects distinct and visible, which would otherwise be indistinct or invisible. Telescopes are either *refracting* or *reflecting;* the former consist of different lenses through which the objects are seen by rays refracted by them to the eye, and the latter consist of specula from which the rays are reflected and passed to the eye. The lens turned towards the object is called the *object-glass;* that to which the eye is applied, the *eye-glass;* and if the telescope consist of more than two lenses, all but the *object-glass* are called *eye-glasses.* It was not till the middle of the 16th century (1549), that the application of glasses to this instrument was made. In fact, no advances were made in the construction of telescopes before the time of Galileo, who, while at Venice, accidentally heard that a sort of optic was made in Holland, which brought distant objects nearer; and considering how this thing might be, he set to work and ground two pieces of glass into a form, as well as he could, and fitted them to the two ends of an organ pipe, with which he produced an effect that delighted and astonished all beholders. After exhibiting the wonders of this invention to the Venetians on the top of the tower of St. Mark, he devoted himself wholly to the improving and perfecting the telescope, in which he was so successful that it has been usual to give him the honour of being the inventor.——REFRACTING TELESCOPES. The *Galilean telescope* consists of a convex converging object-glass, and a concave diverging eye-glass. Its magnifying power is equal to the focal length of the object-glass divided by the focal length of the eye-glass; the length of the tube is the difference between the focal lengths of the lenses. It causes an object to be seen erect, and its principle is applied in the opera glass, for which purpose its magnifying power is rarely greater than 4, and often as low as 2.——The *astronomical telescope* consists of a converging object-glass and a converging eye-glass. Its magnifying power is equal to the focal distance of the object-glass, divided by the focal distance of the eye-glass; the length of the tube is the sum of the focal distances of the lenses. It causes the object to appear inverted.——The *terrestrial telescope* differs from the astronomical, in having two additional lenses in the tube of the eye-glass, for the purpose of rendering the inverted image erect.——REFLECTING TELESCOPES. In these, the speculum or mirror performs the same office as the object-glass in refracting telescopes, and is called the *object mirror.* They were invented by Gregory, and described by him in 1663, but were first used by Newton. The *Newtonian telescope* consists of a tube, at the end of the interior of which is a speculum, which exactly fits it; the rays from the object, entering the open end of the tube, are reflected back in a convergent state to a small diagonal speculum which throws them out through an aperture at the side of the tube, not far from its open end. The small diagonal speculum is intended to prevent the necessity of the observer looking down into the tube, and thus intercepting a large quantity of light from the object. The magnifying power is equal to the focal length of the object mirror, divided by that of the eye-glass which is used.——The *Gregorian telescope* resembles the last, except that the small mirror is not placed diagonally but transversely, so as to throw the rays back through an opening in the centre of the object mirror; after forming an image which is viewed by an eye-piece, when the rays have passed through the aperture. The magnifying power is obtained in the same way as with the Newtonian telescope, and the image is erect.——The *Cassegranian telescope* resembles the Gregorian, except that the small mirror is convex instead of concave; it requires a shorter tube, but the image is inverted.——The *Herschelian telescope* requires no second speculum; and thus a loss of light by second reflection is avoided. The object mirror, which has no perforation, is placed at the end of the tube in an inclined position, so as to bring the focal image near the edge of the tube, where, without interfering with the light entering the telescope, it is viewed by an eye-piece; the image is, however, slightly injured by the oblique reflection. The magnifying power is formed in the same way as with the Newtonian telescope. Herschel's gigantic telescope, erected at Slough, near Windsor, was completed August 28, 1789; and on the same day the sixth satellite of Saturn was discovered. The diameter of the polished surface of the speculum was 49½ inches, its thickness 3½ inches, and its weight when cast 2,118lbs.; its focal length was 40 feet, and it admitted a power of 6450 to be applied to it. Such large telescopes collect immense quantities of light, which enable the observer to perceive objects quite invisible with smaller instruments. The tube of this telescope was of iron, 40 feet in length, and upwards of 4 feet in diameter. *Lord Rosse's telescope* at Birr Castle, in Ireland, is yet more stupendous. It has two object mirrors of six feet diameter, and 53 feet focal length. Its tube is of wood upwards of 50 feet in length, and more than 6 feet in diameter; refracting telescopes also, of great magnitude, have been recently constructed. In that at *Pulkova*, near St. Petersburgh, the object-glass has a clear aperture of nearly 15 inches, and its focal length is 22½ feet.

Among the eye-pieces belonging to this telescope, there are powers as high as 2000. There are telescopes of very great power at Cambridge, near Boston, U.S., and at Cambridge in England.

TELLU'RIUM (*tellus*, the earth: *Lat.*), a metal found in very small quantities, in the metallic state, combined with gold and silver, in the gold mines of Transylvania. It is white, brilliant, brittle, and easily fusible. Its spec. grav. is about 6·25: it is combustible; with oxygen, it forms *tellurous*, and *telluric acids;* and with hydrogen, *hydrotelluric acid.*——*Tellurium*, a machine for the illustration of the motions and phenomena of the earth.

TEM'PERAMENT (*temperamentum;* from *tempero*, I proportion duly: *Lat.*), that peculiarity of organization which in some measure influences our actions, thoughts, and feelings. The ancients distinguished four temperaments—the *Choleric* or *Bilious*, the *Phlegmatic*, the *Melancholic*, and the *Sanguineous;* which derived their names from the supposed excess of imaginary fluids in the human body. To these, some have added the *Nervous.*——*Temperament*, in Music, the accommodation or adjustment of the imperfect sounds, by transferring a portion of their defects to the more perfect ones, to remedy in part the false intervals of instruments of fixed sounds, as the piano, organ, &c. The necessity for temperament arises from the interval of a tone not being always the same; for example, that lying between the fourth and fifth of the scale, contains nine small parts termed commas, while that between the fifth and sixth of the major scale contains only eight commas. The diatonic semitone contains five commas; the chromatic, three or four according to the magnitude of the tone; and the different situations of these elements, with regard to each other, causes intervals of the same name to consist of different degrees. They are *tempered*, by reducing the whole, more nearly to mean distances from each other.

TEM'PERANCE SOCI'ETIES (*temperantia*, moderation: *Lat.*). The evils of intemperance had long been the subject of much anxious observation, not merely in Great Britain, but elsewhere, more especially in the United States, and the idea of concentrating public sentiment upon it, in some form, to produce important results, seems to have been first conceived there: a meeting, called the General Association of Massachusetts Proper, having been held in 1813, for the express object of 'checking the progress of intemperance.' The first attempt of the society was to collect facts towards a precise exhibition of the nature and magnitude of the existing evil, with the view of drawing public attention to it, and of directing endeavours for its removal. The reports presented, from year to year, embraced statements and calculations which were found to make out a case of the most appalling nature, such as to amaze even those whose solicitude on the subject had been greatest. In 1830, from data carefully collected, the Massachusetts society stated in their report, that the number who died annually victims of intemperance was estimated at above 37,000; and that 72,000,000 gallons of distilled spirits were consumed in the country, being about six gallons, on an average, for every man, woman, and child of the whole population. It also stated that about 400,000 of the community were confirmed drunkards; and that there appeared reason to believe that intemperance was responsible for four-fifths of the crimes committed in the country, for at least three quarters of the pauperism existing, and for at least one third of the mental derangement. By these exposures, and an unrelaxing perseverance in the course they had commenced; by the circulation of tracts and the addresses of travelling agents; by the formation of auxiliary associations, and by obtaining individual responsibility, for the performance of a variety of duties tending to promote the great object in view, public notice was attracted, and it led to an imitation of the practice in Great Britain and Ireland. The basis on which these associations have been formed, at least in the outset, has been that of an engagement, on the part of each member, to abstain from the use of distilled spirits, except for medicinal purposes; and to forbear to provide them for the entertainment of friends or the supply of dependents. But of late years new societies have sprung into existence, whose practice of temperance is yet more strict; and they accordingly pledge themselves to a total abstinence, not from ardent spirits only, but from all wines and fermented liquors. This class is known by the name of *Tee-totallers.* Some years since, a great movement was made in Ireland by Father Mathew in favour of temperance.

TEM'PERATE ZONE (*temperatus*, moderate: *Lat.*), in Geography, the space on the earth between the tropics and the polar circles: where the heat is less than in the tropics, and the cold less than in the polar circles. The *north temperate zone* reaches from the tropic of Cancer to the Arctic circle, and the *south temperate zone* from the tropic of Capricorn to the Antarctic circle. Each has a breadth of 645 miles.

TEM'PERATURE (*temperatura*, proportion: *Lat.*), in Physics, a definite degree of sensible heat, as indicated by the thermometer; or the constitution of the air according to the diversity of the seasons or difference of climate, &c. The annual variation of heat is inconsiderable between the tropics, and becomes greater and greater as we approach the poles. This arises from the combination of two causes; namely, the greater or less directness of the sun's rays; and the duration of their action, or the length of time from sunrise to sunset.

TEM'PEST (*tempestas: Lat.*), a storm of excessive violence. [See STORMS.]

TEM'PLARS, or KNIGHTS OF THE TEMPLE, a military order of religious, established at Jerusalem, A.D. 1118, for the protection of pilgrims travelling to the Holy Land. During nearly six hundred years this order maintained an important character in Europe. In every nation it had a particular governor, called *master of the Temple*, or of the *militia of the Temple*. Its riches became immense; a fact which, among many others, justifies the observation of Raynal, that persons who have laid down rules for religious societies have done so with the sole view of making holy men; but that they have laboured more directly and more effectually to make rich ones. Towards the beginning of the fourteenth century, the Templars were charged with leaning to Mohammedanism, and, in consequence, the order was abolished under pope Clement V., Edward II. of England, and Philip the Fair of France. In 1307, all the members in England were arrested, and of these, seven suffered at the stake. In 1312, their final suppression was effected by the council of Vienna, by the direction of which fifty others of these persecuted men suffered death in the flames. The vast estates of the order fell partly into the hands of the sovereigns of the countries in which they were situated, and partly into those of the Hospitallers and other military orders. In the thirteenth century, it possessed 9,000 lordships, &c. The charges of heresy, idolatry, &c., preferred against them were not supported; the real causes of their destruction were, most probably, their arrogance and enormous wealth.

TEM'PLE (*templum*: *Lat.*), an edifice dedicated to some deity. The word is generally confined to buildings erected for heathen worship; with the exception of that at Jerusalem, called *the temple*. The earliest temples were merely an open spot, with a rude altar of earth and stones; or an enclosure like that of *Stonehenge*. The Egyptian temples were remarkable for massive dimensions, the cell, however, being always small. Those of Greece were of the most magnificent description, and were the examples after which the Romans erected theirs. The temples of Greece and Rome have been classed by Vitruvius into those *in antis*, the *Prostyle*, *Amphiprostyle*, *Peripteral*, *Dipteral*, *Pseudodipteral*, and the *Hypæthral* [see these terms].——The *Temples* in London are two inns of court, so called because anciently the dwellings of the Knights Templar. They are called the Inner and the Middle Temple, and are situated near the Thames. In ancient times there was a third called the Outer Temple, which no longer exists. On the suppression of the order of Knights Templar, the pope granted their forfeited property to the Knights Hospitaller of St. John of Jerusalem, who demised it to some law students who wished to live quietly in the suburbs. James I. granted the Temples to certain persons from whom originated the incorporated society of the 'Students and Practicers of the Laws of England,' in whom the property is now vested. That property is extraparochial, and is separated by a wall from the rest of the city, having its own entrance gates, which are locked at night. [See INNS OF COURT.]——*Temples*, in Anatomy, the name of the sides of the face above the ears, in which are the temporal arteries, veins, &c.

TEM'PO (*Ital.*), in Music, a word used to signify time. The different degrees of time are designated by the following terms: *largo*, *adagio*, *andante*, *allegro*, and *presto*; and the intermediate degrees are described by additions. [See these terms respectively.]

TEM'PORAL (*temporalis*, pertaining to time: *Lat.*), belonging to secular concerns; not spiritual; as, the *temporal* revenues of the church, called temporalities. *Temporal courts* are those which take cognizance of civil suits.

TEM'PORAL BONES (*temporalis*, pertaining to the temples: *Lat.*), two irregular bones, one on each side of the head. Comparative anatomy shows them to be, in reality, an assemblage of five bones, the *squamous*, *zygomatic*, *tympanic*, *petrous*, and *mastoid*: continuing permanently separate in the cold-blooded classes of animals; but coalescing in the warm-blooded, with the exception of the tympanic, which remains detached in birds.

TENA'CITY (*tenacitas*: from *tenax*, holding fast: *Lat.*), the degree of force with which the particles of bodies cohere, or are held together; a term applied particularly to metals, which may be drawn into wire, as gold and silver.

TENAC'ULUM (*Lat.*), a surgical instrument, formed with a hook at one end, for taking up and drawing out the mouths of bleeding arteries, to secure them by ligaments.

TENAIL' (*Fr.*), in Fortification, an outwork consisting of two parallel sides with a front, in which is a re-entering angle. It is single or double.

TEN'AILLONS, in Fortification, works constructed on each side of the ravelins, like the lunettes; but differing in this, that one of the faces of the tenaillon is in the direction of the ravelin, whereas that of the lunette is perpendicular to it.

TEN'ANT (*Fr.*; from *tenens*, holding: *Lat.*), in Law, one who occupies lands or tenements at a yearly rent, for life, years, or at will.——*Tenant in capite*, is one who held immediately of the king. According to the feudal system, all lands in England are considered as held immediately or mediately of the king, who is styled lord paramount. Such tenants, however, were considered as having the fee of the lands and permanent possession. This tenure has been abolished: those tenures now created by the crown being in *common socage*.

TENCH, the *Tinca vulgaris* of ichthyologists, a fish of the carp family, common in ponds and rivers. It is very tenacious of life. The colour of its body is a greenish olive gold.

TEN'DER (*attendre*, to wait for: *Fr.*), a small vessel employed to attend a larger one for supplying her with provisions or naval stores, or to convey intelligence, &c.——In Law, an offer either of money to pay a debt, or of service to be performed, in order to save a liability or forfeiture which would be incurred by non-payment or non-performance. A money tender must be absolute and unconditional, in money actually produced, not in copper if it can be paid in silver, nor in silver if it can be paid in Bank of England notes or gold.

TEN'DO ACHIL'LIS (the tendon of Achilles: *Lat.*), in Anatomy, the tendon which connects the calf of the leg with the heel. It was so called, because, according to mythological fable, Thetis, the mother of Achilles, held him by that part when she dipped him in the river Styx, to make him invulnerable.

TEN'DONS, in Anatomy, white elastic fibres, which connect the muscles with the bones.

TEN'DRIL (*tendron: Fr.*), a slender twining branch, by which one plant attaches itself to another object. Sometimes it is a metamorphosed leaf which has no lamina, or which has the midrib projecting beyond it, retaining its tapering figure, and becoming long and twisted. In the vine, it is an abortive bunch of flowers proceeding from the stem opposite a leaf; in the passion flower, a metamorphosed branch, growing from the axil of a leaf; in the genus *Strophanthus*, the thin extended point of a petal. In some plants the stalk of a normal leaf has the power of twisting round an object.

TEN'ET (*tenet*, he holds: *Lat.*), an opinion, principle, or doctrine which a person believes and maintains; as the tenets of Christianity, &c.

TEN'NANTITE, in Mineralogy, arsenical sulphuret of copper and iron; a mineral of a lead colour, or iron-black, massive or crystallized, found in Cornwall.

TEN'NE (*tanné: Fr.*) in Heraldry, a colour consisting of red and yellow in the coats of gentry; which is represented in engraving by diagonal lines from the dexter to the sinister side of the shield, traversed by perpendicular lines.

TEN'NIS, a kind of play or game in which a ball is kept in motion between opposite parties who strike it with rackets.

TEN'ON (*Fr.*), in Carpentry, the end of a piece of timber, which is fitted to a mortise for insertion, &c. The form of a tenon is various, as square, dove-tailed, &c.

TEN'OR, in Music, the middle part of a composition; being the ordinary compass of the human voice, when neither raised to a treble or lowered to a bass. It is the second of the four parts, reckoning from the bass; and was originally the air, to which the other parts were auxiliary. What is called *counter-tenor* (between the treble and the tenor) is in reality only a higher tenor.

TENSE (*tempus*, time: *Lat.*), in Grammar, an inflection of verbs by which they are made to signify or distinguish the time of actions or events; as the *present tense*, denoting the time that now is; the *preterite* or *past*, the time that was; and the *future*, the time that will be. Some tenses likewise denote the state of the action, as to its completeness or otherwise, in a certain degree or time, as the *imperfect tense*, which denotes an unfinished action at a certain time; the *perfect*, a finished action at any time; and the *pluperfect*, a finished action before a certain time.

TEN'SION (*tensio: Lat.*), the state of being stretched or strained. Thus, animals sustain and move themselves by the tension of their muscles and nerves; and a chord or musical string gives an acuter or deeper sound, as it is in a greater or less degree of tension, that is, more or less stretched.——*Tension* with reference to vapours signifies elasticity. It increases with the temperature, and is usually expressed in terms of the pressure of the atmosphere or with reference to the height of a column of mercury which the given vapour is capable of supporting.——In Electrical science *tension* has reference to the quantity of electricity that any given surface may be charged with; the greater the quantity the greater the tension.

TENSONS (*contentio*, a contest: *Lat.*), Provençal poems in dialogue between two speakers, in which each recited in turn a stanza with the same rhymes. If the interlocutors were more than two it was called a *Torneyamen*. These skirmishes took place at the festivals of the barons, before a court of love composed of ladies, who discussed not only the claims of the two poets but the merit of the question, and then gravely delivered judgment. Specimens of these poems have been preserved.

TEN'SOR (*tendo*, I stretch out: *Lat.*), in Anatomy, an epithet for a muscle which extends the part to which it is fixed; as, the *tensor palati*, *tensor tympani*, &c.

TENT (*tente: Fr.*), in Surgery, a roll of lint for dilating openings, sinuses, &c.——A portable dwelling or pavilion made of canvas, used for sheltering persons from the weather, particularly soldiers in camp. The wandering Arabs and Tartars dwell in tents.

TEN'TACLE (*tento*, I try: *Lat.*), in Natural history, a filiform elongated, inarticulate appendage, placed on the head or near the mouth of many of the lower animals. They are used as instruments of exploration or prehension. Thus, the dorsal tentacles of some molluscs, the oral tentacles of Polypes, &c.

TEN'TER-GROUND (*tentus*, stretched out: *Lat.*), a place where cloth is stretched and bleached.

TENTHRE'DO, in Entomology, a genus of Hymenopterous insects, termed in English the *Sawfly*, because the female uses her sting like a saw, to cut out spaces in the bark of trees, for the purpose of depositing her eggs.

TENTORIUM, (a tent: *Lat.*), in Anatomy a covering of *dura mater* stretched over the cerebellum. It forms a bony roof in leaping animals.

TEN'URE (*Fr.* from *teneo*, I hold: *Lat.*), in Law, the manner of holding lands, &c. of a superior. [See FEUDAL SYSTEM, FEE, &c.]——*Tenures in capite*, or chief, were those held immediately of the crown; *mesne tenure*, those held of inferior lords. Under the feudal service, tenures were reduced to four kinds, *knight service* or chivalry, *free socage*, *pure villeinage*, and *villein socage*.

TERATOL'OGY (*teras*, a monster; and *logos*, a discourse: *Gr.*), that branch of phy siological science which treats of malformations and monstrosities.

TEREBIN'THINE (*terebinthinos*, made of turpentine: *Gr.*), in Chemistry, consisting of turpentine, or partaking of its qualities.

TEREBRAN'TIA (*terebro*, I bore: *Lat.*), that section of Hymenopterous insects which possesses an anal instrument for the perforation of the bodies of animals, or the substance of plants. The *borer* is peculiar to the female, and consists of one portion sheathed by two others. It is intended to prepare a suitable place for depositing the eggs, and hence is termed the ovipositor.

TEREBRAT'ULA (same *deriv.*), a genus of shell-bearing molluscs belonging to the class of *Brachiopoda*. One of the valves is perforated. Their forms (says Mr. S. P. Woodward) are symmetrical, and so commonly resemble antique lamps that they were called 'lamp-shells' by the old naturalists; the hole which in a lamp admits the wick serves in the lamp-shell for the passage of the pedicle by which it is attached to submarine objects.

TERE'DO (*Lat.*; from *tero*, I pierce), the *shipworm*, a genus of testaceous molluscs which bore their dwellings in submerged timbers, and are most destructive to sunken piles, ships' bottoms; and some small crustaceans belonging to the genera *Limnoria* and *Chelura* also bore into submerged timber and reduce it to a state resembling honeycomb.

TERM (*terminus*, a boundary: *Lat.*), in Law, the space of time formerly allotted in the courts for the trial of causes, the rest of the year being considered vacation. Business, however, has increased so much that although the terms are still kept on foot as affording dates, the judges hold sittings after the terms. In England, there are four terms in the year: Hilary, Easter, Trinity, and Michaelmas terms. Hilary term begins the 11th, and ends the 31st of January; Easter term begins the 15th of April, and ends the 8th of May; Trinity term begins the 22nd of May, and ends the 12th of June; and Michaelmas term begins the 2nd of November, and ends the 25th of November. These are subject to slight change, on account of the occurrence of certain holidays. They are observed by the courts of queen's bench, the common pleas, and exchequer, but not by the parliament or by inferior courts.——In the Arts, a word or expression that denotes something peculiar to an art: as, a technical *term*.——In Contracts, *terms* mean conditions upon which work is agreed to be performed.——In Logic, the expression, in language, of an idea obtained by the act of apprehension. It may consist of one word, or of more than one; but every word is not *Categorematic*, that is, capable of being used as a term; some, such as adverbs, prepositions, &c., are *syncategorematic*, that is, can form only part of a term. The infinitive mood is itself a term; any other part of a verb is a mixed word, resolvable into a term, and a *copula* (or auxiliary verb), which gives tense, mood, and position. Categorematics are divided into *singular*, as Cæsar'; and *common*, as 'man,' 'animal,' &c. The subject of a proposition may be either singular or common; the predicate *must* be common. When words are used in a vague or general sense, they are said to be *of the first intention;* when in the limited or specific sense, which they bear in some art or science, *of the second intention.*——*Term*, in Universities, &c., the fixed period or time during which students are compelled to reside there previously to their taking a degree. These fall within the four quarters of the year, and are distinguished by the same names as the law terms.

TERM'INAL (*terminalis*, terminal: *Lat.*), in Botany, growing at the end of a branch or stem; as, a *terminal* scape, flower, or spike.

TER'MINI (*terminus*, a boundary: *Lat.*), in ancient Architecture, figures used by the Romans for the support of entablatures, in the place of columns. The upper part consisted of the head and breast of a human body, and the lower of the inverted frustum of a cone. They were so called because they were principally used as boundary marks; and represented their god Terminus, whose altar was on the Tarpeian rock; where he was represented with a human head, without feet or arms, to intimate that he never moved, wherever he might be placed. An annual feast, called Terminalia, was held by the Romans on the 23rd of February in honour of the god Terminus. The two owners of adjacent property crowned the statue with garlands; and raised a rude altar, on which they offered some corn, honeycombs, and wine; and sacrificed a lamb, or a sucking pig. They concluded with singing the praises of the god.——Also pedestals increasing in magnitude as they rise; or parallelopipeds used for the reception of busts.

TERMIN'THUS (*terminthos*, a swelling like the fruit of the terebinth tree: *Gr.*), in Surgery, a black pustule, generally appearing on the legs. It is not certain that we mean by this term the same disease as that described by Greek writers.

TERMI'TES (the plural form of *Termes*: *Lat.*), social insects often called white ants, although of a widely different structure from true ants. There are many species, some of which inhabit our island, but the family receives its greatest development in hot countries, where some of the species build large conical houses, or *termitaria*, composed of particles of earth cemented together by their secretions into a material as hard as stone. These houses are penetrated within by galleries running in all directions from chamber to chamber. In each community besides winged males and females there are wingless neuters of two classes, fighters and workers, and both are blind. On emerging from the egg, termites have the form which they retain through life, never being grubs, and not becoming pupal like the true ants in the course of their development. In each termitarium there is a king and queen who are closely guarded by some of the workers in a chamber which lies on the middle of the house. Both are without wings, and are much larger than their subjects. As fast as the queen deposits her eggs they are carried off by the workers and placed in cells elsewhere. The ordinary males and females never work, and when they have acquired their wings they fly forth and disseminate their kind. Some of them, after shedding their wings, become kings and queens of other colonies. Some species construct nests of earth on the trunks and branches of trees; others live inside trees. Termites perform the duty of hastening the decomposition of decaying wood and vegetation.

TERMINOL'OGY (*terminus*, a term : *Lat.*; and *logos*, a discourse : *Gr.*), that branch of a science or art which explains the meaning of its technical terms. In some sciences it is of particular importance.

TER'NATE (*terni*, three each : *Lat.*), in Botany, an epithet for a leaf that has three leaflets on a petiole, as in trefoil, strawberry, bramble, &c. There are leaves also *biternate* and *triternate*, having three ternate or three biternate leaflets.

TER'RACE (*Fr.*; from *terra*, earth : *Lat.*), a platform or bank of earth raised and breasted, particularly in fortifications. Also, a raised walk in a garden, having sloping sides laid with turf.

TER'RA COT'TA (*terra cocta*, baked clay : *Lat.*), the name given to works of art formed of baked clay. Ancient specimens of terra cotta work of admirable design have been discovered in Tuscany and Rome. They consist of lamps and vessels of various kinds, besides entire figures and reliefs.

TER'RA DI SIEN'A (Siena earth : *Ital.*), a brown ferruginous ochre, employed in painting.

TER'RÆ FIL'IUS (a son of the earth : *Lat.*), a classical term for a person of low origin. Also, by an ancient custom, which was abolished about a century since, a title assumed by the undergraduate who delivered an annual oration, in which great licence was permitted.

TER'RA FIR'MA (*Lat.*), the main land; the name particularly given to a country of South America, extending from the Atlantic to the Pacific ocean, to the extent of 1,300 miles.

TER'RA INCOG'NITA (unknown land : *Lat.*), a frequent inscription on old maps.

TER'RA JAPON'ICA (Japan earth : *Lat.*), the old pharmaceutical name for *catechu*, the inspissated juice of a species of *Acacia*. It was formerly supposed to be an earthy mineral.

TERRE PLEIN (an open space : *Fr.*), in Fortification, the horizontal surface of the rampart where the guns are placed and worked. It is bounded outside by the parapet, and inside by the inner slope of the rampart.

TERRE-VERTE (green earth : *Fr.*), a species of chlorite of a green or olive colour. It is a hydrated silicate of the oxide of iron and potash with a little magnesia and alumina. The green earth of Verona, formerly used as a pigment, is a subspecies of this mineral.

TER'TIAN (*tertiana*; from *tertianus*, belonging to the third : *Lat.*), in Medicine, an ague or intermitting fever, the paroxysms of which return every alternate day.

TER'TIARY FORMATIONS (*tertiarius*, belonging to the third part : *Lat.*), in Geology, a series of strata posterior in date to the secondary (the latest portion of which is the cretaceous series), and extending to certain deposits that are termed post-pliocene. This series has been divided into groups according to the relative numbers of recent and extinct species of shells which they contain. The oldest group of beds, containing only about 3½ per cent. of recent species, has been denominated EOCENE; that with from 17 to 30 per cent. of recent shells constitutes the MIOCENE group; whilst that containing from 35 to 95 per cent. of recent shells has been formed into the PLIOCENE group.

TERZ'A RIMA (*Ital.*), the verse in which Dante composed his DIVINA COMMEDIA. In a set of six lines three rhyming lines alternate with two rhyming lines, and a third which has two corresponding rhymes in the next set of six. By this contrivance each line has always two other lines rhyming with it, except at the beginning and the end of the cantos. Thus,

ABABCB, CDCDED,

and so forth. The rhyming words in Italian poetry are all trochees.

TES'SELATED (*tesselatus*; from *tessella*, a little cube : *Lat.*), formed in little squares or mosaic work, as a *tesselated* pavement.

TES'SULAR (*tessella*, a small cube : *Lat.*), a term applied to a system of crystals, including the *cube*, *tetrahedron*, &c.

TEST (*Fr.*; from *testis*, one who attests : *Lat.*), in Chemistry, a term applied to any substance which serves to detect the presence of any constituent in a compound; thus barytes will indicate the presence of sulphuric acid; starch that of iodine, &c. Also, in Metallurgy, a cupel or pot for separating base metals from gold or silver.

TESTA'CEA (*Lat.*; from *testa*, a shell), in Natural History, a name given to such of the class mollusca as have shells. [See MOLLUSCA, SHELLS.]

TES'TAMENT (*testamentum*; from *testor*, I make a will : *Lat.*), in Law, a solemn authentic instrument in writing, by which a person declares his last will, as to the disposal of his estate and effects after his death. [See WILL.]——*Testament*, in Theology, the name of each of the volumes of the Holy Scriptures, that is, of the Old and the New Testament. The first *Testament* printed in the English language appeared in 1526. This translation was made by William Tyndale, and was published abroad, after which it was circulated at Oxford and London. Tonstall, bishop of London, and Sir Thomas More, bought up almost the whole impression, and burnt it at St. Paul's Cross.

TEST AND COR'PORATION ACTS, the usual designation for statutes, by which all magistrates in corporations, and all who bear any office civil or military, are to take the oaths of allegiance and supremacy, to renounce the doctrine that it is lawful to bear arms against the sovereign; and within a year before their election, receive the sacrament, according to the rites of the Church of England. There were intended to be the bulwarks of the Protestant church, but have been long evaded by means of acts of indemnity passed annually for the relief of those neglecting to comply with them, and in many cases the necessity for taking these tests has been abolished.

TESTIMONY (*testimonium;* from testis, *a witness: Lat.*), the evidence of facts, oral, as in a court of law; or written, as in the records of history. Testimony is probable and credible when in accordance with general experience, corroborated, and disinterested; but improbable, and unworthy of credit, when contrary to general experience, and uncorroborated.

TEST'ING (*teste,* the cupel used by refiners: *Fr.;* from *testa,* baked earthenware: *Lat.*), in Metallurgy, the operation of refining large quantities of gold or silver by means of lead, in the vessel called a *test.* In this process the extraneous matter is vitrified, scorified, or driven off, and the metal left pure.

TESTU'DO (a tortoise: *Lat.*), in Zoology, a genus of tortoises. [See TORTOISE.]——*Testudo,* in the Military art of the ancients, a contrivance used by the Greeks and Romans in attacking fortified places. It was formed by the troops holding their shields over their heads, so as that one overlapped another, and formed a penthouse, which threw off the missiles of the enemy from the soldiers, as they approached the walls. It received its name from its resemblance to the shell of a tortoise. A similar defence was sometimes formed of boards, and moved on wheels.

TET'ANUS (*Lat.;* from *tetanos,* literally a stretching: *Gr.*), in Medicine, a spasmodic contraction of the muscles of voluntary motion, particularly of those which shut the lower jaw; this is termed a *locked jaw.* It is frequently caused by lacerated wounds, which are not necessarily of a severe character; also, in hot climates, by exposure to cold, and suppressed perspiration; in the former case it is generally fatal, in the latter is sometimes cured.

TET'RACHORD (*tetra,* four; and *chordē,* a string; *Gr.*), in Ancient Music, a concord consisting of four degrees or intervals, and four terms or sounds; called by us a fourth.

TET'RAD (*tetras,* the number four: *Gr.*), the number four; a collection of four things.

TETRADAC'TYLOUS (*tetra,* four; and *daktulos,* a finger: *Gr.*), having four toes.

TETRADIAPA'SON (*tetra,* four; and *diapason,* the octave: *Gr.*), a musical chord, otherwise called a quadruple eighth or twenty-ninth.

TETRADRACH'MA (*tetradrachmos: Gr.*), in ancient coinage, a silver coin worth four drachmas, or 2*s.* 7*d.*, the drachma being estimated at 7¾*d.* sterling.

TETRADYNA'MIA, the 15th class of the Linnæan system of plants; containing two orders, *siliculosa* and *siliquosa,* with four long and two short stamens.

TET'RAGON (*tetra,* four; and *gōnia,* an angle: *Gr.*), in Geometry, a figure having four angles, as a square, a rhombus, &c.

TETRAGYN'IA, in Botany, one of the orders in several of the Linnæan classes, comprehending those plants which have four pistils.

TETRAHE'DRAL (*tetra,* four; and *hedra,* a base: *Gr.*), having four equal sides.——In Botany, having four sides; as a tetrahedral pod or silique.

TETRAHE'DRON (same *deriv.*), in Geometry, a figure comprehended under four equilateral and equal triangles. It is one of the five *Platonic bodies,* or regular solids.

TETRAHEXAHE'DRAL (*tetra,* four; *hex,* six; and *hedra,* a base: *Gr.*), in Crystallography, exhibiting four ranges of faces, one above another, each range containing six faces.

TETRAN'DRIA (*tetra,* four; and *anēr,* a male: *Gr.*), the fourth class of the Linnæan system of plants, comprising plants bearing flowers, with four stamens.

TETRA'O (a black cock, or black grouse: *Lat.*), in Ornithology, a genus of rasorial birds, including the grouse, capercailzie, and ptarmigan.

TETRAPET'ALOUS (*tetra,* four; and *petalon,* a leaf: *Gr.*), in Botany, containing four distinct petals or flower leaves.

TETRAPH'YLLOUS (*tetra,* four; and *phullon,* a leaf: *Gr.*), in Botany, consisting of four distinct leaves or leaflets; as a *tetraphyllous* calyx.

TETRAP'LA (*tetraplous,* fourfold: *Gr.*), in Ecclesiastical History, a bible arranged by Origen in four columns, each containing a different Greek version: one being the Septuagint; and the others those of Aquila, Symmachus, and Theodosius.

TE'TRARCH (*tetrarchēs;* from *tetra,* four; and *archo,* I govern: *Gr.*), a Roman governor of the fourth part of a province. Such originally was the import of the title tetrarch; but it was afterwards applied to any petty king or sovereign. The office, or the territory of a tetrarch was called a *tetrarchate.*

TETRASPER'MOUS (*tetra,* four; and *sperma,* seed: *Gr.*), in Botany, an epithet for a plant which produces four seeds in each flower; as the rough leaved or verticillate plants.

TETRAS'TICH (*tetrastichos;* from *tetra,* four; and *stichos,* a line: *Gr.*), a stanza, epigram, or poem consisting of four verses.

TETRAS'TYLE (*tetrastulos;* from *tetra,* four; and *stulos,* a column: *Gr.*), in Ancient Architecture, a building with four columns in front.

TET'TER (*teter: Sax.*), in Medicine, a common name of several cutaneous diseases. Also, a disease of animals, of the ring-worm kind.

TEUTON'IC, belonging to the Teutones, an ancient people of Germany. The Teutonic language is the parent of the German, Dutch, and Anglo-Saxon.——*Teutonic order,* a religious order of knights, established towards the close of the twelfth century, and thus called as consisting chiefly of Germans or Teutones. The original object of the association was to defend the Christian religion against the infidels, and to take care of the sick in the Holy Land. It was at one period immensely rich and powerful, and it still retains a titular existence in Austria.

TEXT (*texte: Fr.*; from *textus: Lat.*), a term signifying an original discourse, exclusive of any note or commentary. Also, a certain passage of scripture, chosen by a preacher to be the subject of his sermon. ——*Text-book* a book containing the leading principles or most important points of a science or branch of learning, arranged in order for the use of students.

TEX'TILE (*textilis: Lat.*), an epithet given to whatever is woven or capable of being woven. *Textile fabrics* accordingly signify stuffs of every description, no matter what the materials may be of which they are composed.

THALAM'IFLORÆ (*thalamus*, a receptacle; *flos*, a flower: *Lat.*), in Botany, a subclass of flowering plants, comprehending those which have distinct petals and stamens which proceed from beneath the ovary. Such plants have both a calyx and corolla, and the petals are inserted into the receptacle. The ranunculus and poppy orders may be taken as examples.

THAL'LOGENS (*thallos*, a frond; *gennao*, I produce: *Gr.*), in Botany, a vast class of cryptogamic plants of low organization. They are destitute of true stems, and of a vascular system, consisting simply of expansions of cellular tissue. Sea weeds, funguses, and lichens belong to this class.

THAL'LIUM, one of the metals recently discovered by means of spectrum analysis. It has been found in certain mineral waters, but the largest quantity has been yielded by flue-dust. It has a metallic lustre, with a colour near that of tin. Its specific gravity is 11·9. It is very soft, being easily scratched by lead, is very malleable, but is with difficulty drawn into wire. Rubbed on paper it gives a dark mark, which rapidly fades. Its melting point is 550° F., and it vaporises at a little higher temperature. It yields, during combustion in the flame of a spirit-lamp, an intense green colour (whence its name, from *thallos*, *Gr.*, a green bud); and it communicates a single green line to the spectrum, by which line it was originally detected.

THAM'MUZ, the tenth month of the Jewish civil year, containing 29 days, and answering to a part of June and of July. ——In Mythology, the name under which the Phœnicians worshipped Osiris, or Adonis.

THANE (*thegn: Sax.*), a title of honour among the Anglo-Saxons. Its original meaning was servant, and it was applied to the followers of kings and chieftains; but it was afterwards given to all landed proprietors above the degree of alderman, and under that of earl. There were superior and subordinate thanes.

THAU'MATROPE (*thauma*, a wonder; and *trepo*, I turn: *Gr.*), an optical device to exhibit the *persistence of vision*. The principle is well exemplified by rapidly whirling round a burning stick, which apparently produces a circle of fire. [See PHENAKISTOSCOPE.]

THE'A (*tcha: Chin.*), in Botany, the systematic name of the tea tree. [See TEA.]

THE'ATRE (*theatron*; from *theaomai*, I behold: *Gr.*), a building for the exhibition of dramatic performances. The most ancient theatres in Greece and Rome were temporary, being composed of boards placed gradually above each other for the convenience of spectators. The improvements of the theatre kept pace with dramatic taste; and they were eventually built in a handsome and durable manner, rivalling in size and splendour the most costly edifices. The first royal licence for a theatre in England was granted in 1557, to James Burbage and four others, servants to the Earl of Leicester, to act plays at the Globe, Bankside, or in any part of England; but long before their time *miracles* were represented in the open fields. Dramatic exhibitions of all kinds were opposed by the Puritans in 1633, and suspended till 1660, when Charles II. licensed two companies, Killegrew's and Davenant's; the first at the Bull, Vere Street, Clare Market, which in a year or two was removed to Drury Lane; the other in Dorset Gardens. Till that time boys performed women's parts. Sir William Davenant introduced operas; both companies united, 1684, and continued together till 1694; when the principal of them, under Betterton, obtained a licence, and withdrew to Portugal Street, Lincoln's Inn Fields, in 1695. [See DRAMA.]

THE'ISM (*Theos*, God: *Gr.*), the belief or acknowledgment of the existence of a God, as opposed to *Atheism*. It has sometimes been defined to be *Deism*; but *Theism* differs from *Deism*, for although Deism implies a belief in the existence of a God, yet it signifies in modern usage a denial of revelation, which *Theism* does not.

THEOC'RACY (*theokratia*: from *Theos*, God; and *kratos*, power: *Gr.*), a state governed by the immediate direction of God.

THEOD'OLITE, a mathematical instrument much used in surveying, for the taking of angles. It consists of a small telescope, which may be moved both vertically and horizontally; the vertical and horizontal angles described with it, being indicated by graduated circles.

THEOG'ONY (*theogonia: Gr.*), that branch of the heathen theology which taught the genealogy of their gods.

THEOLO'GIUM (*Theos*, a god; and *logeion*, a speaking place: *Gr.*), in the ancient theatre, a kind of little stage, above that on which the ordinary actors appeared; being the place where the machinery of the gods was arranged.

THEOL'OGY (*theologia*; from *Theos*, God; and *logos*, a discourse: *Gr.*), the study of religion. It may be divided into several branches, as, 1. *Exegetical theology*, which consists in the explanation and interpretation of the scriptures. 2. *Didactic* or *speculative* theology, by which the several doctrines of religion are stated, explained, and supported. 3. *Systematic theology*, which arranges religious dogmas methodically, so as to enable us to contemplate them in their natural connection, and to perceive both the mutual dependence of the parts and the symmetry of the whole. 4. *Practical theology*, which consists of an exhibition, first, of precepts and directions; and, secondly, of the motives for complying with them.

THEOMAN'CY (*Theos*, God; and *manteia*, prophecy: *Gr.*), a species of prophecy in which a god himself was believed to reveal future events; as, when a deity spoke through an oracle, or by means of a sibyl.

THEOR'BO (*tiorba: Ital.*), a musical instrument made in form of a large lute, except that it has two necks. It was formerly used by the Italians for playing a thorough bass.

THE'OREM (*theōrēma*; from *theoreo*, I look at: *Gr.*), in Geometry, a something proposed to be *proved*; in contradistinction to a *problem*, which requires something to be *done*. A theorem requires a *demonstration*; a problem, a *solution*.——In Algebra or Analysis, it is sometimes used to denote a rule, particularly when that rule is expressed by symbols. A *universal theorem* extends to any quantity without restriction. A *particular theorem* extends only to a particular quantity, as a *negative theorem* expresses the impossibility of any assertion.

THE'ORY (*theōria*, a looking at: *Gr*). All men in every rational action of their lives are followers of theory, and they may be divided into those who follow good, and those who follow bad, theory. It is therefore a matter of importance to discover the difference between good and bad theory, to ascertain the tests by which one may be distinguished from the other. The real object is to discover cases of constant sequences, and when such a case of constancy has been found and correctly set forth in words, we have arrived at a correct theory. But when the proposition which professes to express a case of constant sequence gives us, in point of fact, a case which is not constant, we have before us a wrong theory. Of correct theories, however, some relate to things which have but little relation to the concerns of man, whilst others are founded on facts that have a close connection with the happiness of our race. It is the latter class of theories that are of importance to us; and the degree of that importance must always be in proportion as the sequences which they formulise have an influential bearing on man's life. Moreover, whilst one theory, though correct as far as it goes, expresses but a short sequence of events, another will embrace a much larger sequence, and summarise a much greater number of facts. The latter kind of theory is, of course, the most valuable, since more knowledge is of greater worth than less. It may be laid down as incontrovertible that the man whose mind is furnished with a greater number of correct theories is better off with regard to correct practice, other things being equal, than the man who possesses fewer correct theories. If theory were proscribed, if men were unable or unwilling to collect the result of their observations into general formulæ, civilisation would cease to exist, and there could be no advance beyond the stage of mere animality.——An exposition of the principles of any science, as the *theory* of music.——The philosophical explanation of phenomena, either physical or moral, as Newton's *theory* of optics; Smith's *theory* of moral sentiments.

THEOS'OPHIST (*Theos*, God; and *sophistēs*, a wise man: *Gr.*), one who pretends to derive his knowledge from divine illumination.

THERAPEU'TÆ (*therapeutes*; from *therapeuo*, I attend upon: *Gr.*), a term applied to those who are wholly employed in the services of religion; but specially to a particular sect of men, concerning whom there have been great disputes among the learned. It is generally supposed that St. Mark established a particular society of Christians about Alexandria, of whom Philo gives an account, and calls them *Therapeutæ*. He speaks of them as a sect, retired from the world, who spent their time in reading the writings of ancient authors, in singing hymns and songs composed by some of their own sect, and in dancing together the whole night. Some suppose they were *Essenes*; others imagine they were Jews, residing in Egypt; Eusebius and others consider them as Christians.

THERAPEU'TICS (*therapeutikos*, sanative: *Gr.*), that part of medicine which relates to the modes of action and effects of remedies, and their application for the prevention and cure of diseases.

THERI'ACA (*Gr.*: literally, belonging to wild beasts), a name given by the ancients to various compositions esteemed efficacious against the effects of poison. Some few have been transferred to comparatively modern pharmacopœiæ under the names of the *theriaca of Andromachus*, the *theriaca Veneta*, the *confectio Mithridati*, &c. They were in the form of confections, and extremely complicated. The theriaca Veneta was a compound of sixty-four drugs, prepared, pulverized, and reduced by means of honey to an electuary.

THERMAL WATERS (*thermē*, heat: *Gr.*), warm or tepid mineral waters, whose heat varies from 92° to 112°.

THERMO-ELECTRICITY, the electricity developed by *change of temperature*. It is most probably that electricity which, being developed by the successive heating and cooling of the earth's surface during rotation on its axis, causes the earth to be a magnet. If two pieces of copper wire are attached to a delicate galvanometer, on bringing the free ends together, between the finger and thumb, sufficient electricity will be set free to deflect the needle. The most convenient apparatus for exhibiting thermo-electrical currents consists of alternate bars of antimony and bismuth soldered together at their ends, so as to form a compound bar. If this is placed with one set of its soldered joints resting on ice, and a bar of hot iron resting on the other set, a current of electricity will be perceived when the outer bars are connected with the galvanometer Thermo-electricity has been termed *stero-electricity* (*stereos*, solid: *Gr.*), on account of being produced by solids without the use of a fluid.

THERMOM'ETER (*thermē*, heat; and *metron*, a measure: *Gr.*), an instrument for measuring the degree of sensible heat. The ordinary thermometer consists of a slender glass tube, having a bulb at one end, and being hermetically sealed at the other. The bulb and a portion of the tube contain mercury, or alcohol coloured—almost always the former; the rest of the tube is a vacuum. When the temperature is raised or lowered, the fluid expands or contracts, so as to occupy a portion of the tube less or greater than before; and the amount of expansion or contraction is indicated by a scale attached to the instrument. There are two fixed points in a thermometer, from which the graduation is made: one, the freezing point of water, which is unchangeable; the other, the boiling point of the same fluid, which also, *with a given atmospheric pressure*, is unvariable. The *zero*, or 0, of *Fahrenheit* is 32° below the freezing point; it is the temperature obtained by a mixture of snow and salt, which he erroneously supposed was the lowest possible; the boiling point of water is 212°. The thermometer of Fahrenheit is chiefly used in this country. In the *Centigrade* thermometer, the zero is the freezing point; and 100° the boiling point of water. This thermometer has been adopted in France, and very generally in science. In the thermometer of *Reaumur*, the zero is also the freezing point; but 80° is the boiling point of water. This thermometer is used in Germany. Thermometers have been so constructed as to register of themselves the highest and lowest degrees of temperature to which they have been brought, within a certain period; and are termed *self-registering maximum and minimum thermometers*. It is not certainly known by whom the thermometer was invented; it dates from about the beginning of the 17th century; the Dutch ascribe it to Cornelius Drebbel, the Italians to Sanctorio.

THER'MOSTAT (*thermē*, heat; *statos*, a standing: *Gr.*), the name of an apparatus for regulating temperature in distillation, ventilating apartments, heating baths or hothouses, &c. That invented by Ure acts on the physical principle, that when two thin metallic bars of different expansibilities are rivetted or soldered facewise together, any change of temperature in them will cause a sensible movement of flexure in the compound bar, to one side or other; which movement may be made to operate, by the intervention of levers, &c., in any desired degree upon valves, stopcocks, stove-registers, air-ventilators, &c.: so as to regulate the temperature of the media in which the compound bars are placed.

THE'SIS (*Gr.*, literally, a placing), a position or proposition which a person advances, and offers to maintain; or which is actually maintained by argument. The term is more particularly applied to the questions propounded, in most of the Scotch and continental universities, to the students, previously to their obtaining a degree.

THIRST, the desire for drink, arising from a dryness and heat of the mouth, sometimes extending along the œsophagus to the stomach. During thirst, the posterior fauces become red, the mucous secretion and saliva thick, and viscid; a vague inquietude, restlessness of mind, and quick pulse follow; and unless drink is obtained, respiration becomes laborious, and the mouth opens to admit the cool air. Habitual thirst is produced by excess in drinking. After exercise in warm weather, milk and water, or warm tea, is far better than beer, wine, spirits, &c., which, in such cases, generally produce febrile action.

THIRTY YEARS' WAR, the war carried on between the Roman Catholics and Protestants, in the first half of the 17th century. It is considered to have begun with the insurrection of the Bohemians, in 1618; and to have ended with the peace of Westphalia, in 1648.

THIS'TLE, the common name of rough prickly plants belonging to the sub-order *Cynarocephalæ* of the nat. ord. *Compositæ*, especially the species of the genus *Carduus*. The stem is thick and herbaceous; the leaves more or less pinnated, and beset with spines; the flowers are disposed in large dense heads, surrounded with a close, scaly, and usually spiny involucre.

THO'MISTS, the followers of Thomas Aquinas, with respect to predestination and grace; in opposition to Scotus.

THOM'SONITE, a mineral of the *Zeolite* family, occurring generally in masses of a radiated structure.

THOR, a Scandinavian deity, the son of Odin and Freya, who presided over mischievous spirits inhabiting the air. He appears to have been in some respects confounded with Jupiter; and hence the day sacred to that god was dedicated to Thor, under a name retained in English, in the word *Thurs-day*.

THORAC'IC (*thōrax*, the breast: *Gr.*), in Ichthyology, a term applied to the ventral fins of fishes when they are placed in front of the pectoral fins.——*Thoracic duct*, in Anatomy, the trunk of the absorbent vessels, which is of a serpentine form.

THO'RAX (*Gr.*), in Anatomy, that part of the human skeleton which consists of the bones of the chest; also, the cavity of the chest.

THORI'NA, in Mineralogy, a primitive earth found in thorite, a Norwegian mineral, the hydrated oxide of thorina, which is the oxide of thorium. Thorina is white, infusible, and very heavy, its spec. grav. being 9·4; no acid dissolves it except sulphuric acid, and that with difficulty. It is known from alumina and glucina by being insoluble in potash; and from zirconia by being precipitated with ferrocyanide of potassium.

THOROUGH-BASS, in Music, the art of composition according to the rules of harmony. This branch of the musical science is twofold, *theoretical* and *practical*. Theo-

retical thorough-bass comprehends the knowledge of the connection and disposition of all the several chords, harmonious and dissonant; and includes all the established laws by which they are formed and regulated. *Practical* thorough-bass supposes a familiar acquaintance with the figures, a facility in taking the chords they indicate, and judgment in the various applications and effects of those chords in accompaniment.

THRUSH, the common name of some birds belonging to the genus *Turdus*, in the family *Merulidæ*. In Britain there are three species, the Missel Thrush (*T. viscivorus*), White's Thrush (*T. Whitii*), and the Song Thrush or Throstle (*T. musicus*). The last is one of the finest singing birds in this country. Its song, which is rich and varied, commences early in the season, and continues for nine months. It is not migratory, but is supposed in winter to remove from the more northern to the southern provinces of England.——*Thrush*, in Medicine, ulcers in the mouth and fauces

THUGS (*thuggee*, a deceiver: *Hind.*), an association of murderers formed of men of all castes, and from all parts of India. 'Their origin is uncertain, but it is supposed to date from soon after the Mohammedan conquest. They now claim a divine original, and are supposed to have supernatural powers, and to be the emissaries of the divinity, like the wolf, the tiger, and the bear. Many belong to the most amiable, intelligent, and respectable classes of the lower and even middle ranks; they love their profession, regard murder as sport, and are never haunted with dreams or troubled with pangs of conscience during hours of solitude or in the last moments of life. The victim is an acceptable sacrifice to the goddess Davee, who by some classes is supposed to eat the lifeless body, and thus save her votaries the necessity of concealing it. They are extremely superstitious, always consulting omens All worship the pick-axe, which is symbolical of their profession, and an oath sworn on it binds closer than on the Koran. They rise through various grades: the lowest are scouts; the second sextons, the third are holders of the victims' hands; the highest, stranglers. All agree in never practising cruelty, or robbing previous to murder, in never allowing any but infants to escape (and these are trained to Thuggee), and in never leaving a trace of such goods as may be identified. Murder of woman is against all rules A mild-looking man who had been born and bred to the profession, had committed many murders, saw no harm in them, and felt neither shame nor remorce, explained to me how the gang waylay the unwary traveller, enter into conversation with him, and have him suddenly seized, when the superior throws his own linen girdle round the victim's neck and strangles him, pressing the knuckles against the spine. One assassin frankly confessed to having been engaged in 931 murders. Sometimes 150 persons collect into one gang, and their profits have often been immense; the murder of six persons on one occasion yielding upwards of 8000*l*. The profession have particular stations which they generally select for murder, throwing the body of their victim into a well.'—DR. J. D. HOOKER. The government has exerted itself so energetically to put down this horrible association that several thousands of Thugs have been seized, and some hundreds hanged, so that these wretches are now seldom heard of where they once swarmed.

THULE, a name given by the ancients to the most northern country with which they were acquainted. Some authors imagine it to have been Iceland; others consider it to have been the coast of Norway; while there are many who have not attached to it the idea of any precise country.

THUM'MIM, a Hebrew word, denoting perfection The Urim and Thummim were precious stones on the high priests' vestments, which were consulted by the Jews to learn the will of God as long as their government was a *Theocracy*.

THUN'DER, the report which accompanies the discharge of electric fluid in the clouds, or between them and the earth. When this explosion is near, the thunder has a rattling or clattering sound; and when distant, a heavy and rumbling. This sharpness of the sound when near, and its rumbling when distant, are the principal means by which we can ascertain its proximity or distance. There are two ways of explaining the production of thunder by the electrical discharge: one that the electricity opens for itself a passage through the air, like a projectile; and that the sound is caused by the rush of air into the vacuum which follows, the reverberation being produced by the clouds. The other, that when the electric fluid passes between two points, there is a decomposition and recomposition of the electricity in all the intervening media; and therefore a more or less violent vibration, which gives rise to sound. The continued roll would arise from the comparatively slow propagation of sound through the air. During a thunderstorm, proximity to lofty objects, and good conductors, should be carefully avoided. [See LIGHTNING] Hence it is unsafe, in such circumstances, to be near trees, sheets of water, gilt furniture, bellwires, &c. It is dangerous to be near a fireplace, on account of the quantity of metal it contains, and the likelihood of the chimney being struck. It is not safe to be in a large open plain. The middle of the house is the best place, and the security is increased by sitting on a good non-conductor: such as a feather bed, mattress, &c.

THURS'DAY. [See THOR.]

THYME (*thumos: Gr.*), in Botany, a labiate plant of the genus *Thymus*. The garden thyme is a warm, pungent aromatic, much in use for culinary purposes. Its essential oil is extremely acrid and pungent.

THY'MUS (*Lat.; from thumos: Gr.*), in Anatomy, a glandular body divided into lobes, situated behind the sternum. It is largest in the fœtus, diminishes after birth, and in adults often entirely disappears. In calves it is called the *sweetbread*.

THY'ROID (*thureos*, a shield; and *eidos*, form: *Gr.*), in Anatomy, a term applied to one of the cartilages of the larynx. The thyroid or scutiform cartilage is largest in men, in whom it is sometimes very prominent, and obtains the name of *Adam's apple.*—The *thyroid gland* is situated near the thyroid cartilage, and the *thyroid veins* and *arteries* belong to it.

THYRSE, or THYRSUS (*thursos*, the stalk of umbelliferous plants: *Gr.*), in Botany, a species of inflorescence; a dense or close panicle, with the peduncles longest at the middle, and therefore more or less of an ovate figure, as in the lilac.

THYR'SUS (*thursos: Gr.*), in Antiquity, an attribute of Bacchus and his votaries. It consisted of a wand wreathed with ivy and vine leaves, with a pine cone at the top. It was used at all the festivals held in honour of the god of wine.

THYSANOP'TERA (*thusanoi*, fringes; *pteion*, a wing: *Gr.*), in Entomology, an order of small insects formerly comprehended amongst the *Hemiptera*. They have two pairs of wings, which are narrow and fringed with long hairs. Their metamorphosis is incomplete, the larvæ resembling the perfect insects, except that they have no wings. The typical genus is *Thrips;* of which one species, the *T. cerealium*, sometimes does great damage to the grain crops. Other species attack various other plants, and inflict much injury.

TIA'RA (*Gr.*), the covering for the head used by the ancient Persians. It was in the form of a tower, adorned with peacock's feathers; was sometimes encompassed with a diadem; and often had a half-moon embroidered on it.—Also, the crown worn by the Popes. At first they used only a high round cap like the other bishops. Nicholas I. added the first gold circle, as a sign of the civil power; Boniface added the second, about the year 1300; and Urban V. the third, about 1365.

TIB'IA (*Lat.*), in Anatomy, the largest of the two bones which form the leg.—In Entomology, the fourth joint of the leg; it is very long.

TIC DOULOUREU'X (*Fr.*), in Medicine, a most painful affection of a facial nerve, deriving its name from its sudden and excruciating stroke. It is characterized by acute pain, attended with convulsive twitchings of the muscles; and is regarded as one of those diseases which generally baffle medical skill.

TICK, the popular name of certain parasitic insects, which belong to the genus *Ixodes*, in the class *Arachnida*. They have four pairs of legs, and a rostrum, which they bury in the skin of animals, whose blood they suck until their originally flat and oval bodies are distended into a globular form. They are found in woods upon brushwood, grass, &c., from which they transfer themselves to the bodies of passing animals.

TIDES, the *flux* and *reflux*, or rise and fall of the sea. The phenomena connected with the tides are not very numerous, nor, with our present knowledge, hard to be explained. The tides are a consequence of the attraction of gravitation. The earth revolves on its axis once a day, and the moon is retained in its orbit by the mutual attraction which exists between it and the earth. These two facts suffice to explain the tides. The water on the side of the earth next the moon, the water on the side of the earth farthest from the moon, and the mass of the earth between both, are all attracted by the moon with different forces, on account of their different distances. The waters next the moon are attracted most, and therefore fall most towards the moon, leaving the earth behind, and bulging out from it. The waters farthest from the moon are less attracted by the moon than the mass of earth in front of them: and therefore, being left behind by the earth, which is drawn more towards the moon, they bulge out behind. Hence there will be high water under the moon, because the water moves towards the moon faster than the earth; and also high water at the same time at the opposite side of the earth, because the mass of earth moves towards the moon faster than the water behind it. The two masses of water, or tides, are equal: since the water in one of them flows as much more rapidly towards the moon than the earth as the earth moves more rapidly towards the moon than the water in the other. The water flows from all directions to form these heaps, as they may be termed; the resulting currents are modified by promontories, islands, winds, &c., and by the fluid having a less velocity of rotation than that part of the earth to which it flows, on account of coming from the neighbourhood of the poles. As time is required for the communication of motion, the highest part of the tidal wave is not immediately under the moon, but about 30° to the eastward of it. There are two tides in twenty-four hours; one on the side of the earth *next* the moon, another on the side *farthest* from the moon. The tide is about fifty minutes later, in any given place, on each succeeding day; because that place cannot return to its former position in less than a day; and it has besides to follow the moon, which has moved on in her orbit. The sun also causes tides; but though it is larger than the moon, its effect is less, on account of its greater distance. When the sun and moon act together, that is when they are in *conjunction* or in *opposition*, the tides are larger, and are called *spring* tides, which occur a little after new and full moon, not exactly at the happening of these events, because time is required for the communication of motion. When the moon is in *quadratures* the effects of the sun and moon are opposed; and there are small, or *neap tides*. When the sun and moon, or both, are nearest to the earth, the tides produced by them are highest: hence the tides are greatest after the autumnal, and before the vernal equinox. The effects of the planets in causing tides are inappreciable. There must evidently be tides in the atmosphere; though, as we are immersed in that fluid, they are ordinarily imperceptible to us. The extreme practical importance of a correct knowledge of the tides, on coasts and in harbours, has in many places led to the prosecution of some sort of regular observations, to determine what is called the *establishment* of particular ports: that is, the interval of time after the new and full moon has passed the meridian, at which it is high water in them; from this the time of high water on other days is known by the age of the moon.

TIERCE (*tiers: Fr.*), in Heraldry, an epithet for the field when it is divided into three parts.

TIERS ETAT (the third estate: *Fr.*). This term was universally applied in France to the mass of the people under the old *régime*. Before the cities rose to wealth and influence, the nobility and clergy possessed the property of almost the whole country, and the people were subject to the most degrading humiliations. But, as trade and commerce began to render men independent, and they were able to shake off their feudal bonds, the *tiers état* gradually rose into importance; and at length the third estate, during the revolution, may be said to have become the nation itself.

TI'GER, the *Tigris regalis* of naturalists, a powerful beast of the feline family inhabiting the East Indies, and some other parts of Asia; but, wherever it is known, its strength and sanguinary disposition are such as to excite the terror of the inhabitants. It comes into the midst of villages in the night time, for the purpose of carrying off cattle, and it has often been known to single out for prey some human victim. No animal, except the elephant, is capable of resisting it. The Bengal tiger has an average length of eight feet, and is between three and four feet high. It is of a yellowish brown colour, with transverse black stripes; and the tail has alternate black and yellow rings.

TIL'LER, a lever or piece of wood fastened in the head of the rudder, by which it is moved. In small ships and boats it is called the *helm*.——*Tiller-rope*, the rope which forms a communication between the fore end of the tiller and the wheel.

TIM'BER, a name for all kinds of wood to be used in Building, Carpentry, Joinery, Turnery, &c. We also apply the word to standing trees which are suitable for these purposes. Timber is preserved from that particular kind of decay called dry rot by saturating it with solutions of various metallic salts, such as copperas (sulphate of iron), corrosive sublimate (bichloride of mercury), chloride of zinc, and sulphate of copper. Creosote has also been employed for the same purpose.——In ships, a *timber* is a rib piece of wood, branching outward from the keel in a curving direction.

TIM'BREL (*timbré*: *Fr.*; from *tympanum*, a drum: *Lat.*), an ancient musical instrument; a kind of tabor or tambourine, frequently mentioned in Scripture.

TIME, a portion of duration, whether past, present, or future; marked by certain periods or measures, chiefly by the motion and revolution of the sun.——*Absolute* time is that which is considered in itself, without reference to the portion of duration to which it belongs.——*Relative* time is that which is considered with reference to the termini of some specific interval of duration.——*Apparent* time is that deduced from observations of the sun: that which is shown by a good sun-dial.——*Mean* time is that shown by a well-regulated watch: it is not the same as that shown by a sun-dial, because the apparent motion of the sun in the heavens is not uniform.——*Sidereal* time is that portion of a sidereal day which has elapsed since the transit of the first point of Aries. It represents, at any moment, the right ascension of whatever heavenly body is then on the meridian.——*Astronomical* time of the day is reckoned from the mean noon of that day, and is reckoned on to twenty-four hours in mean time.——*Civil* time is mean time, applied to the purposes of civil life. The civil day commences at the midnight preceding the noon of the day, and it is divided into two parts of twelve hours each; the first twelve hours being A. M. or *ante meridian* (before noon); the second twelve hours being P. M. or *post meridian* (after noon).——*Time*, in music, the measure of sounds, with reference to their continuance or duration. Thus, in *common time*, the bar is equal in length to a semibreve, or a minim, according to the character used to indicate the time; in *triple time*, it is that part of a semibreve expressed by the fraction placed at the beginning of the staff—thus $\frac{3}{4}$ means three-fourths of a semibreve, or three crotchets; $\frac{12}{8}$, twelve eighths of a semibreve, or twelve quavers, &c. The time is also affected by certain technical terms employed; such as *allegro*, *presto*, &c

TIMOC'RACY (*timē*, an assessment; *kratos*, power: *Gr.*), that form of government whose laws require a certain property, or position in society, to enable a citizen to be capable of the highest offices.

TIN, a metal of a silver-white colour, very ductile and malleable. Its spec. grav. is 7·29. It gives out, while bending, a crackling noise; is fusible at about 442°, a heat much less than that of ignition; is soluble in muriatic acid, and is rapidly converted, by dilute nitric acid, into a white oxide. Tin has been known from the earliest ages. It was much employed by the Egyptians in the arts, and by the Greeks as an alloy with other metals. Pliny speaks of it under the name of *white lead*, as a metal well known in the arts, and even applied in the fabrication of many ornaments of luxury. He ascribes to the Gauls the invention of the art of tinning, or covering other metals with a thin coat of tin. The Phœnicians procured it from Spain and from Britain, with which places they carried on a very lucrative commerce. According to Aristotle, the tin mines of Cornwall were known and worked in his time; and they still continue the most productive of any in Europe. Diodorus Siculus, who wrote 40 years before Christ, describes the method of working these mines; and says that their produce was conveyed to Gaul, and thence to different parts of Italy. Tin which is very pure, but not so easily manufactured as the Cornish, is also obtained in great quantities in South America. The first process to which tin ore is subjected is grinding; it is then washed, to remove the impurities. The specific gravity is so high that it is easy to wash away the earths, and even some of the foreign metallic ores with which it is often mingled. The next process is roasting the ore in a reverberatory furnace along with anthracite, which removes the oxygen and foreign matters. It afterwards repeatedly undergoes the effects of fusion, and being at length purified from the admixture of all foreign substances, it is cast into blocks, weighing each about 300 lbs. There are only two ores of tin—the *peroxide*, which is tin-stone or capiterite, and *tin pyrites*, which is sulphuret of tin or stannine; the former, only, is sufficiently abundant for metallurgic purposes. Tin unites easily with various metals; combined with copper in different proportions, it forms *bronze, bell metal*, and other useful alloys. Lead and tin may be combined in any proportion by fusion; the resulting alloy is harder, and possesses much more tenacity than tin; and these qualities are at a maximum when it is composed of three parts of tin and one of lead. Alloyed with small proportions of antimony, copper, and bismuth, tin is formed into various wares resembling silver, under the names of block-tin, Britannia metal, &c. Tin is much used in the state of very thin leaves; it is then called *tin-foil*. This is made from the finest tin, first cast into an ingot, then laminated to a certain extent, and afterwards beat out with a hammer. Tin is used for tinning copper, iron, &c. It adheres strongly to the surface of iron: thin sheets of which coated with it constitute *tin-plate*, or white iron, of which so many articles in domestic use are made. The iron is coated with tin in order to prevent its rusting. Tin-foil coated with mercury, forms the reflecting surface of looking-glasses. A compound of tin and gold, the *purple of Cassius*, gives fine shades of purple to stain glass and artificial gems. Oxide of tin is an ingredient in the white and yellow glazes of pottery, and, fused with the materials of flint, forms *enamel*. Nitrate of tin is the basis of the scarlet employed in dying wool, and many bright colours used by the calico-printer and cotton-dyer. In 1858, the mines of Cornwall produced 10,618 tons of ore; from which 6,920 tons of tin were obtained. Of this, the exports, wrought and unwrought, were of the value of 1,660,556*l*. In the same year, 628 tons of tin-ore were imported, and 59,115 tons of tin.

TIN'CAL, an impure biborate of soda (borax) imported from Thibet, Persia, and China. Borax is prepared from it.

TINC'TURE (*tinctura; from tingo*, I moisten: *Lat.*), in Medicine, a spirituous solution of such vegetable and animal substances as are soluble in rectified or proof spirit. The virtues of many vegetables are extracted almost equally by water and rectified spirit; but, in their aqueous and spirituous tinctures, there is this difference —that the active parts in the former are blended with a large proportion of innate gummy matter, on which their solubility in this menstruum in a great measure depends; while, in the latter, they are almost free from gum. *Tinctures*, in Heraldry, refer to the colours of the shield, and are of three kinds: metals, colours, and furs. The metals are *or* (gold), *argent* (silver); the colours, *gules* (red), *azure* (blue), *sable* (black), *vert* (green), *purpure* (purple), *sanguine* or murrey (dark blood red), and *tenny* (orange); the chief furs are *ermine* and *vair*. They are thus expressed in engravings: *or* by small points; *argent* by a plain surface; *gules* by vertical lines; *azure* by horizontal lines; *sable* by vertical and horizontal lines crossing one another; *vert* by diagonal lines from right to left; *purpure* by diagonal lines from left to right; *tenny* by vertical lines crossed by diagonal lines from right to left; and *sanguine* by diagonal lines crossing one another.

TIRAILLEURS (marksmen: *Fr.*), in the Military art, a name given to a species of infantry seldom intended to fight in close order, but generally dispersed, two and two, always supporting each other, and usually skirmishing in front of the line. They must be particularly expert in their movements: so as to collect quickly into masses at the sound of the bugle; to disperse again with equal expedition; and to act constantly with the whole army. They were introduced by the French during the wars of their revolution.

TIS'RI, the first month of the Hebrew civil year, and the seventh of the ecclesiastical; answering to a part of our September and a part of October.

TIS'SUE, cloth interwoven with gold or silver, or with figured colours.——In Anatomy, the parts of which organized bodies are composed. These parts are made up of cells of different shapes and texture, differently put together. There are, for example, the osseous tissue, the muscular tissue, the nervous tissue, &c.

TITAN'IUM, in Mineralogy, a metal of an orange red colour, first found in Cornwall. It occurs in different states of oxidation. The minute copper-coloured crystals sometimes found in the slag of the iron-smelting furnaces are pure titanium. It is very infusible; will scratch glass, but not crystal; it resists the action of air and acids; but is oxidized by nitre, at a red heat. Its spec. grav. is 5·8. It has been found in Italy and New Zealand along with iron sand, which has been ejected from volcanoes.

TITHES (*teotha*, tenth: *Sax.*), in Ecclesiastical law, the tenth part of the increase annually arising from the profits of land and stock, allotted to the clergy for their support. The custom of paying tithes, or of offering a tenth, has not only been practised under the Jewish law, and by Christians, but we also find something like it among the heathens. The Babylonians and Egyptians gave their kings a tenth of their revenues. The Romans offered a tenth of all they took from their enemies to the gods; and the Gauls, in like manner, gave a tenth to their god Mars. Tithes are personal, predial, or mixed; *personal*, when accruing from labour, art, or trade; *predial*, when arising from the earth, as hay, wood, and fruit; and *mixed*, when accruing from beasts, which are fed off the land.——Tithes, also, are either great or small. The *great*, or parsonage tithes, belong to the rector; the *small*, or vicarage tithes, to the vicar. The great tithes often belong to a lay impropriator or to a college. By a recent enactment, the tithes have been changed into a rent-charge, which is never personal, but apportioned among the lands of the parish, to be paid by their occupiers; and recoverable by holding the lands until they are paid. This is not fixed, being for each year the price of a certain quantity of corn, at the average of the seven years immediately preceding.

TI'THING, a community of ten men, into which all England was divided in the time of the Saxons. [See TYTHING.]

TOAD (*tathe: Sax.*), the name of tailless Batrachian reptiles belonging to the family *Bufonidæ*. The common toad of Britain, *Bufo vulgaris*, was formerly supposed to be venomous, but now considered harmless. It has a thick squat body covered with warts or tubercles, and a fetid milky juice exudes from a protuberance, studded with pores, behind each eye. Toads are capable of living a long time without food, and have been known to remain (if the repeated instances which have been given are to be relied on) whole years in walls, hollow trees, in the earth, or even when artificially enclosed with plaster. Dr. Buckland, however, states, in reference to a number of experiments which he made on the vitality of toads enclosed in wood and stone: 'It seems that toads cannot live a year excluded totally from atmospheric air, and that they cannot survive two years entirely excluded from food; and there is a want of sufficiently minute and accurate observation in those so frequently recorded cases, where toads are said to be found alive within blocks of stone and wood, in cavities that had no communication whatever with the external air.'

TOAD'-STONE, in Mineralogy, a dark brown basaltic amygdaloid, composed of basalt and green earth, and containing oblong cavities in which is calcareous spar.

TOAD'STOOL, the popular name of various inedible funguses which resemble mushrooms in shape.

TOBAC'CO, the *Nicotiana tabacum* of botanists, nat. order *Solanaceæ*, a herbaceous plant which flourishes in America and all temperate climates, and is remarkable for its acrid and narcotic properties. Its name is probably derived from Tobaco, in the province of Yucatan, where it was first found by the Spaniards. It is much used for smoking; and, when pulverized and otherwise prepared, as snuff. When first used it sometimes occasions vomiting; but the practice of using it in any form soon conquers distate, and forms a relish for it that is strong and almost invincible. It is believed to have been introduced into England by Sir Francis Drake and Sir Walter Raleigh, and we may well be surprised that the discovery in America of a nauseous and poisonous weed of an acrid taste and disagreeable odour, in short, whose only properties are deleterious, should have had so great an influence on the social condition of all nations, that it should have become an article of most extensive commerce, and that its culture should have spread more rapidly than that of the most useful plants. The recent leaves have very little smell or taste; but, when dried, their odour is strong, narcotic, and somewhat fetid; their taste, bitter and extremely acrid. When distilled, they yield the essential oil on which their virtue depends, and which is said to be a virulent poison. Tobacco is extensively cultivated in France and other European countries, in the Levant and India; but the tobacco of Cuba and the United States is considered the best. Tobacco was first brought to France in 1560 by Nicot, from whose name has been formed the botanical name of the genus; and, in 1586, Sir Francis Drake introduced the plant to the English. In 1859 the quantity of tobacco imported into Great Britain and retained for home consumption amounted to nearly 34,800,000 lbs.

TODDY, the juice obtained by wounding the flower spathes, or trunks, of the cocoanut palm and other palms. When fermented it becomes arrack.

TO'GA (*Lat.*; from *tego*, I cover), in Antiquity, a robe without sleeves, worn over the *tunica* in time of peace. It was like a large cloak, and was the distinguishing badge of a Roman citizen. The variety in the colour, the fineness of the wool, and the ornaments attached to it, indicated the rank of the wearer. Its colour was ordinarily that of the wool undyed, but it was of a purer white when worn by candidates; but, in time of mourning, it was made of wool naturally black. An embroidered toga, called *toga picta*, was worn by generals when they triumphed. The chief dignitaries of the state wore a purple band affixed to its edge; it was then called a *toga prætexta*. The dress of matrons was the *stola*, the toga being worn only by women of bad character. Under the emperors the toga went out of fashion.

TOISE, a long measure in France, containing six French feet; equivalent to 1·94904 metres, or 6·3945925 English feet.

TOKAY', a kind of wine produced at Tokay in Hungary, made of white grapes. It is distinguished by its aromatic taste; is not considered good till it is three years old, and it continues to improve as long as it is kept. It is the only wine which is drunk by preference in the turbid state.

TOKEN, a small coin, in copper, brass, or lead, formerly issued by corporations, guild companies, and tradesmen for local circulation before the State undertook to provide a coinage of copper. 'Tokens were issued, says Mr. W. Boyne, 'to such an extent that it is presumed 20,000 varieties were coined in England, Wales, and Ireland. It was not until 1672 that farthings, struck at the Mint, of similar size to those of the present day, were ready for circulation, when tokens were suppressed by a stringent order of the king.'

TOLERA'TION (*toleratio*, an enduring: *Lat.*), in a general sense, the allowance of that which is not wholly approved; but more especially, the allowance of religious opinions and modes of worship in a state, when contrary to or different from those of the established church or belief. The first Toleration act in England was passed in 1689; the Roman Catholic Emancipation act, in 1829, and some subsequent acts have placed dissenters on an equality with members of the established church, except as regards a few of the highest offices; even Jews are not now precluded from an enjoyment of civil rights, on account of their religion.

TOLL (*tollo*, I take: *Lat.*), the name generally given to the duties imposed on travellers and goods passing along roads, bridges, &c. It is sometimes taken by a person for every beast driven across his ground, being then called *toll-traverse*.——Toll, the payment made to the corporation of a town, or the lord or owner of a market or fair, on the sale of certain commodities.

TOMA'TO, or LOVE APPLE, the fruit of several species of *Lycopersicum*, nat. order *Solanaceæ*. They are natives of South America, but are now cultivated in many other places on account of the fruit, which is employed as an ingredient in sauces.

TOM'BAC, a species of brass, with excess of zinc; if arsenic is added, it forms *white tombac*.

TOMEN'TOUS (*tomentum*, a stuffing for cushions: *Lat.*), in Botany, downy; or covered with hairs so close as scarcely to be discernible.

TONE (*tonos*, a note, or tone: *Gr.*), the degree of elevation of any sound: its acuteness or gravity.——Musical Tones differ from those of common speech chiefly by being more prolonged, so as to give the ear a more decided perception of their height, formation, and relation to each other. There are two kinds of tones, major and minor. The *tone major* is in the ratio of 8 to 9, which results from the difference between the fourth and fifth. The *tone minor* is as 9 to 10, resulting from the difference between the minor third and the fourth.——Tone, in Medicine, that state of organization in a body, in which the animal functions are healthy and performed with due vigour. Tone in its primary signification is *tension*, and tension is the primary indication of strength. Hence its application to the natural healthy state of the animal organs.

TONGUE (*tung: Sax.*), in Anatomy, a soft, fleshy viscus, very movable in every direction, situated in the cavity of the mouth, and constituting the organ of taste. It is also an instrument of deglutition, and is a very important aid to pronunciation.

TON'IC (*tonos*, a tone: *Gr.*), in Music, the principal note of the key; upon it all regular melodies depend; and with it all of them terminate, as far as the chief melody is concerned, the inner parts of the harmony concluding on the third or *mediant*, and the fifth or *dominant*. The name is applied also to the octaves above and below the key-note.

TON'ICS, medicines that increase the tone of the muscular fibre, and give vigour and action to the system. Preparations of iron and quinine are amongst the best known tonics.

TON'NAGE, the number of tons which a vessel may safely carry. Formerly the tonnage for the payment of dues was calculated on principles which gave an advantage to vessels badly proportioned, that is, having an excess of breadth. But at present it is calculated on more scientific principles.

TON'QUIN or TONKA BEAN, the seed of a large leguminous tree, the *Dipterix odorata* of botanists, growing in the forests of Brazil. The legume is single-seeded, and can only be obtained when it has fallen to the ground. The seed is used for scenting snuff.

TON'SILS (*tonsillæ: Lat.*), in Anatomy, two remarkable glands, one on each side of the mouth, near the uvula; and in popular language called *almonds of the ears*. Their use is to secrete a mucous humour for lubricating the passages; and they have several excretory ducts opening into the mouth.

TON'TINE, a sort of increasing life annuity; or a loan given by a number of persons with the benefit of survivorship. Thus an annuity is shared among a number, on the principle that the share of each, at his death, is enjoyed by the survivors, until at last the whole goes to the last survivor, or to the last two or three, according to the terms on which the money is advanced. The name is derived from its inventor Laurence *Tonti*, a Neapolitan.

TOOTH'ING, in Architecture, bricks left alternately projecting, at the end of a wall; that they may be bonded into the continuation, when it is carried up.

TO'PAZ (*topazion: Gr.*), a gem or precious stone, very generally of a fine yellow or gold colour. It sometimes occurs in masses, but more usually crystallized in rectangular óctahedrons. The *oriental topaz* is most esteemed; its colour borders on the orange. The *occidental*, or that found in Peru, is of a softer substance, but its colour is nearly the same. The Brazilian topaz becomes rose red, but the Saxon loses its colour, by heat. This gem consists of silica, alumina, and fluoric acid.

TOPE, an Indian word for Buddhist structures, in the shape of pillars, towers, or tumuli, erected as memorials of victory or miracles, or as receptacles for relics. The word is also applied by travellers in India to groves of trees, which often afford shady halting-places.

TO'PHUS (*Lat.*), in Mineralogy, a genus of calcareous earths, which are porous and without lustre, and consist principally of carbonate of lime. Its origin is due to precipitation from water.

TOPOG'RAPHY (*topographia*, from *topŏs*, a place; and *grapho*, I write: *Gr.*), the accurate description of some particular place or tract of land. Topography goes into minute details which geography does not enter upon.

TORNA'DO (*Span.* from *torno*, I turn; *Lat.*), a violent gust of wind, or a tempest, distinguished by a whirling motion. Tornadoes are usually accompanied with thunder, lightning, and torrents of rain; but they are of short duration.

TORPE'DO (*Lat.*, literally numbness), the name given to certain fishes possessing electrical powers allied to the rays. They are also called cramp fishes, and electric rays, and are distinguished by the short and somewhat fleshy tail, and the nearly circular disc formed by the body. The electrical apparatus, which has rendered the torpedo so celebrated, consists of small membranous tubes, disposed like honey-comb; and divided, by horizontal partitions, into small cells, which are filled with mucous matters. By exercising this power, the torpedo is enabled to procure its prey, and to protect itself against enemies. Whatever animal attempts to lay hold of it receives a sudden paralysing shock; and small fishes, it is said, are completely stunned on approaching it. One species has been taken on the British coast, but it is very rare.

TORREFAC'TION (*torrefacio*, I make dry by heat: *Lat.*), in Metallurgy, the operation of roasting ores.——In Pharmacy, the drying or roasting of drugs on a metallic plate, till they are reduced to the state desired.

TORRICEL'LIAN VACUUM, in Physics, the vacuum produced by inverting a tube of sufficient length, hermetically sealed at one end, and filled with mercury, or any other fluid, in a vessel containing the same fluid; and allowing the fluid in the tube to descend, until its weight is counterbalanced by that of the atmosphere. The apparatus will constitute the essential portion of a barometer, and was invented by Torricelli. [See BAROMETER.]

TOR'RID ZONE, (*torridus*, parched: *Lat.*), in Geography, that region of the earth included between the tropics, where the sun is vertical at some period of the year, and where the heat is always great. It is 47°, or 705 geographical miles in width, and is intersected by the equator.

TOR'SION BAL'ANCE (*torsi*, a twisting: *Lat.*), an instrument intended for measuring the intensities of electric or magnetic forces, by establishing an equilibrium between them and the force of torsion. [See ELECTROMETER, TORSION.] The force of torsion is inversely proportional to the length of the wire used, and inversely to the fourth power of its diameter. Brass wire is better than iron; but spun glass is better than either.

TOR'SO (*Ital.*), the trunk of a statue, mutilated of head and limbs.

TOR'TOISE, the name given to those shielded reptiles which live on land or in fresh-water; those which live in the sea being called TURTLES [which see]. The most remarkable features of the tortoises is that their ribs and breast-bone are formed into a bony box with openings in front and behind. Through the front opening the head and fore legs protrude, and through the posterior opening the hind legs and tail. This box is composed of plates which vary in shape in the different species. Their jaws are destitute of teeth and are more like the bill of a bird than the mouth of a quadruped. They are possessed of lungs and are oviparous. The land-tortoises feed on vegetables; one species, the *Cistudo europœa*, is a native of the South of Europe, and lives to a great age.

TOR'TURE (*tortura: Lat.*), the infliction of pain on an accused person, for the purpose of extorting a confession of guilt, or the revelation of accomplices. The Greeks and Romans practised it with regard to slaves; and not unfrequently whole families of these unfortunate people were subjected to it, when an atrocious crime, such as the murder of their master, was committed. It has been used in various countries of modern Europe, and even in England. [See QUESTION.]

TO'RUS (*Lat.*), in Architecture, a round moulding in the bases of columns, resembling the astragal in form, but larger.

TO'RY, in British history, the name given to a political party opposed to the *Whigs*, and considered as adhering to the ancient constitution of England. The word *Tory* is Irish, and was formerly applied to a class of depredators in that country; but the distinctions of *Tory* and *Whig* (as political partisans) were not known before the year 1678, in the reign of Charles II., when those who believed that the Roman Catholics conspired against the king and state, as deposed by Titus Oates, were called *Whigs*, and those who disbelieved it, *Tories*. Of late years the term *Conservatives* has been adopted by the Tories, as tending to convey the best explanation of their principles.

TOUCAN', the name given to scansorial birds of the genus *Rhamphastos*, inhabiting tropical America. They are remarkable for having large cellular beaks, and long, feather-like tongues. They derive their name from their cry, which resembles the word *Tucano*.

TOUCH (*toucher*, to touch: *Fr.*; from *tango: Lat.*), one of the five senses, the organs of which are the nervous papillæ of the skin. The term *touch* is most correctly applied to the sensibility which is diffused over the surface of the body. Touch exists with the most exquisite degree of sensibility at the extremities of the fingers and in the lips.

TOUCH'-NEEDLE, small bars of gold, silver, and copper combined together in all the different proportions and degrees of mixture. These are used by assayers and refiners, in the trial called the *touch*, to discover the purity of any piece of gold or silver by comparing the mark it leaves on the touchstone with those of the bars.

TOUR'MALINE, the *Lyncurium* of the ancients. It is a more perfect form of *schorl*. The transparent coloured kinds are sometimes cut into ringstones, and some of them are used in experiments on the polarization of light. Tourmaline consists of silica, alumina, and soda, with a little oxide of manganese and iron.

TOUR'NAMENTS, martial sports, where knights displayed their gallantry and adroitness, by encountering each other on horseback; the weapons being lances with blunt heads of iron, or the lance and sword used in war—these latter being termed *arms à l'outrance*. 'Impartial taste,' says Gibbon, 'must prefer a Gothic tournament to the Olympic games of classic antiquity. Instead of the naked spectacles, which corrupted the manners of the Greeks, the pompous decoration of the lists was crowned with the presence of chaste and high-born beauty, from whose hands the conqueror received the prize of his dexterity and courage.'—One solitary attempt to imitate the jousts and tournaments of former days in this country was made in recent times at the expense of the late Earl of Eglintoun; but its success was not such as to encourage a repetition of it. Tournaments are still exhibited at the court of Wurtemburg.

TOUR'NIQUET (*Fr.*), a surgical instrument for stopping the flow of blood after an amputation. It is a kind of bandage, straitened or relaxed with a screw.

TOW'ER (*tor*: *Sax.*; from *turris*: *Lat.*), in Architecture, a building raised to a considerable elevation, and consisting of several stories. Towers are either round or square, and they are flat on the top, by which they are distinguished from spires or steeples. Before the invention of guns, places were not only fortified with towers, but attacked with movable towers mounted on wheels, which raised the besiegers to a level with the walls.——*Tower of London.* This ancient edifice stands on the north bank of the Thames, at the eastern extremity of the city. The oldest part, the central White tower or Keep, was built by William I. about 1070. The space enclosed by the walls measures twelve acres five roods, and the circumference on the outside of the ditch is 3156 feet. On the south side of the Tower was an arch called the *traitor's gate*, through which state prisoners were formerly brought from the river. Near the site of the traitor's gate is the *bloody tower* in which it is supposed the princes, Edward V. and his brother, were smothered by order of Richard III. In the south-east enclosure were the royal apartments: for the Tower was a royal palace for nearly 500 years. James I. was the last sovereign who resided here. The regalia are kept at the tower, and are shown, with the other curiosities of the place, to the public.

TOW'ERS, ROUND, remarkable structures in Ireland of great antiquity and of unknown origin, varying from 80 to 120 feet in height. They are cylinders on the frusta of cones, having a door eight or ten feet from the ground; and, at the top, narrow openings turned towards the cardinal points. There are sixty-two of them in Ireland, and two in Scotland. They have generally been considered as, in some way, connected with an ancient religion; and there have been a number of hypotheses regarding their object.

TOXICOL'OGY (*toxikon*, poison; and *logos*, a discourse: *Gr.*), that branch of science which is concerned with poisons; their nature, effects, and antidotes. [See POISONS.]

TRA'CHEA (*Lat.*; from *tracheia*: *Gr.*), in Anatomy, the *windpipe*, a cartilaginous and membranous canal, through which the air passes into the lungs. The operation of making an opening into the windpipe is hence called *tracheotomy*. The words *laryngotomy* and *bronchotomy* are also used to express the same thing.

TRA'CHEOCELE (*trachia*, the windpipe; and *kēlē*, a tumour: *Gr.*), in Medicine, an enlargement of the thyroid gland; bronchocele.

TRA'CHYTE (*trachus*, rough: *Gr.*), a species of ancient lava, often porphyritic, and, when it contains hornblende and augite, passing into those varieties of traps which are termed Basalt, Greenstone, Dolerite, &c. Trachyte is usually of a light grey colour.

TRAC'TION (*tracto*, I drag about: *Lat.*), the act of drawing, or state of being drawn. This word has latterly come much into use, in its primary sense, in reference to the draught on railways, canals, &c.——ANGLE OF TRACTION, that which the direction of the power makes with a given plane.

TRAC'TION EN'GINES, locomotive steam engines, constructed for the purpose of drawing loads upon common roads. The leading principle of traction engines is the provision of a large surface for the tractive power to act upon, so as to prevent the wheels sinking into the ground. Various plans have been adopted. In one the wheels are simply made with broad tyres. In another the engine lays down and then takes up pieces of wood or shoes, upon which the wheels run. In a third, a series of rails hinged together and carried by a separate pair of wheels are employed. The driving wheels of the engine are so arranged that they run upon the rails laid down for them by the carrier wheels.

TRADE, the business of buying and selling, comprehending every species of exchange or dealing. It is, however, chiefly used to denote the barter or purchase and sale of goods, wares, and merchandise, either by wholesale or retail. *Foreign trade* consists in the exportation and importation of goods, or the exchange of the commodities of the different countries. *Inland* or *home trade* is the exchange or buying and selling of goods within a country. The word *trade* has also a more limited signification, designating the business which a person has learned, and which he either carries on or is employed in; as, the *trade* of a carpenter, a smith, &c. The liberal arts, learned professions, and agriculture, are not included.

TRADE MARK, the peculiar figure or design with which a manufacturer stamps or labels his goods in order that they may be recognised in the market. By the Merchandise Marks' Act, which passed the Legislature in 1862, the forging or counterfeiting any trade mark and other dealings with trade marks, with intent to defraud, are made misdemeanours, and are punishable by imprisonment or fine, and all articles to which a forged trade mark is attached are forfeited to the crown. Colourable alterations and imitations of a trade mark are treated as forgeries, and penalties are imposed on persons who sell or expose for sale any article with a forged trade mark, which he shall know to be forged, or with a trade mark wrongfully applied, with a knowledge of the misapplication; also on persons who mark, with intent to defraud, upon any article any false description respecting the number, quantity, measure, or weight of such article, or of the place or country in which such article shall be made, or falsely indicating any article to be the subject of an existing patent.

TRADE-WINDS, easterly winds which constantly prevail, with slight variations, in certain regions within the tropics. The trade-winds, in the Atlantic and Pacific oceans, extend to about 28° of latitude each side of the equator; so that a ship, after passing 30°, may every day expect to meet them. But, on first entering them, they will be found to blow from the east, or even a little southerly; and, as the vessel advances, to draw round gradually to north-east. In the East Indies the trade-winds are periodical, and are called *monsoons*. The trade-winds are caused chiefly by the comparatively high temperature of the torrid zone, and the rotation of the earth from west to east. The heated air ascends, and is replaced by air from the neighbourhood of the poles. This would have a direction from north to south, or vice versâ, according to the pole, whence it comes; but, as the velocity of rotation of the airs near the poles is less than that at the equator, the air from the poles, when approaching the equator, is left behind, during the earth's rotation; it has, therefore, two motions, one from the poles to the equator, the other in opposition to the earth's motion, or from east to west; and, therefore, in accordance with the laws of motion, its direction is compounded of both; that is, its direction is towards the north-west or south-west; and the resulting winds are north-easterly or south-easterly. The same causes modify the tidal current. [See TIDES.]

TRADI'TION (*traditio;* from *trado*, I transmit: *Lat.*), that which is handed down from age to age by oral communication; or, the delivery of opinions, doctrines, practices, rites, and customs from father to son, or from ancestors to posterity. There is nothing which requires greater caution than the credence we give to traditionary information. Every person, every country, every age, involuntarily gives a colouring to facts; to say nothing of intentional misstatements. How many pure inventions creep into notice, and soon become widely repeated and believed, either because they suit the purposes of a party, or because they are presented with an air of credibility! It therefore becomes all persons, but more especially the historian, to examine as far as he is able into the origin of every statement, and the character and situation of those on whose authority it rests. 'Historical evidence, like judicial evidence, says Sir G. C. Lewis, 'is founded on the testimony of credible witnesses. Unless these witnesses had personal and immediate perception of the facts which they report, unless they saw and heard what they undertake to relate as having happened, their evidence is not entitled to credit. As all original witnesses must be contemporary with the events which they attest, it is a necessary condition for the credibility of a witness that he be a contemporary; though a contemporary is not necessarily a credible witness. Unless therefore an historical account can be traced, by probable proof, to the testimony of contemporaries, the first condition of historical credibility fails.' If what is called history be examined with reference to these views, how much is there in the early accounts of every nation which must be rejected without hesitation. If the statements are tainted with suspicion from their inherent improbability; if the accounts are numerous and discrepant, no one having a stronger claim on our attention than any other; if there is an entire absence of contemporary witnesses, documents or inscriptions, it must be evident that we are compelled to withhold our belief from much that passes under the name of history.—— In matters of religion the Jews pay great regard to *tradition;* so also do the Roman Catholics—the latter understanding by the term, sacred truths, supposed to have been orally communicated by Christ and the apostles, which, by the assistance of the Holy Ghost, were preserved in the church from one generation of bishops to another. A reverence for tradition is therefore taught in all Roman Catholic catechisms; and it is the foundation on which they believe in their rites and the characteristic parts of their religious worship: considering it of equal authority with the Scriptures themselves.

TRAG'ACANTH (*tragos*, a he goat; and *akantha*, a thorn: *Gr.—goat's thorn*), a gum which exudes from some spiny species of *Astragalus*, nat. ord. *Leguminosæ*, which grow wild in warm climates. Tragacanth is brought chiefly from Turkey, in small contorted pieces resembling worms; and that which is white, clear, smooth, and vermicular is the best.

TRA'GEDY (*tragōdia;* from *tragos*, a goat; and *ode*, a song: *Gr.*), a drama representing some grand and serious action, and generally terminating in some fatal event. The name is supposed to have originated in the custom of leading about a goat, in procession, at the festival of Bacchus; in whose honour these choral odes, which formed the groundwork of Attic tragedy, were sung, or from a goat being the prize.

TRAGI-COM'EDY, a dramatic piece partaking of the nature both of tragedy and comedy.

TRAJEC'TORY (*trajicio*, I throw down: *Lat.*), the curve described by a body in space. The orbits of the planets would be elliptical but for the disturbing forces which they exert on each other; and the path of a projectile would be a parabola, but for the resistance of the air.

TRAMON'TANE (*transmontanus: Lat.*), lying beyond, or on the farther side of the mountains; applied, particularly by the Italians, to such as live north of the Alps.

TRANCE (*transe: Fr.*), a state in which the voluntary functions of the body are suspended; and the mind is possessed by visions.

TRANSAL'PINE (*transalpinus*, beyond the Alps: *Lat.*), lying to the north or west of the Alps: as, *Transalpine* Gaul: opposed to *Cisalpine*, as understood by the Romans.

TRANSCENDEN'TAL (*transcendo*, I climb over: *Lat.*), in Philosophy, according to the definition of Kant, 'that knowledge which occupies itself not so much with objects as with the way of knowing those objects:' or, 'the philosophy of the pure, merely speculative reason, from which the practical is separated.'——*Transcendental*, in Algebra, a quantity which cannot be represented by an algebraic equation, having a finite number of terms, with determinate indices. Thus: a^x x^x log. x, &c.——A *transcendental equation* is one containing such expressions: and a *transcendental curve*, one defined by such an equation.

TRAN'SCRIPT (*transcriptus*, transferred in writing: *Lat.*), a copy of any original writing; particularly that of an act or instrument inserted in the body of another.

TRAN'SEPT (*trans*, across; and *septuus*, an inclosure: *Lat.*), in Architecture, that aisle of ancient churches, which extends across the nave and main aisles.

TRANS'FER (*transfero*, I carry over: *Lat.*), in Commerce, an act by which a person surrenders his right, interest, or property in anything to another.

TRANSFU'SION (*transfusio*, a pouring from one vessel to another: *Lat.*), in Medicine, the act or operation of transferring the blood of one animal into the vascular system of another, by means of a tube. It was at one period supposed, that in cases of great loss of blood from hæmorrhage, and in certain cases of disease, that the blood belonging to the human body might, with great benefit, be replaced by that of other animals. At first, the trials made appeared to be successful; but afterwards they were attended with bad, and in some instances fatal, results.

TRAN'SIT (*transitus*, a passage: *Lat.*), in Astronomy, the *culminations* or passage of a heavenly body across the meridian of a place. The determination of the exact time at which this happens is of the greatest importance: as, by means of it, the differences of right ascensions, and therefore the relative situations of the fixed stars, &c., are ascertained. It is observed, by means of the *transit instrument* [which see]. Also, the passage of the inferior planets, Mercury and Venus, across the sun's disc. When a smaller body passes behind a larger, it is said to suffer an *occultation*.

TRANSIT INSTRUMENT. An instrument intended for the observation of transits. It consists of a telescope firmly attached to a horizontal axis, the ends of which are directed to the east and west points of the horizon. A system of three, five, and sometimes seven vertical and equidistant wires of extreme minuteness, are placed in the focus of the eye piece; and the middle one is an exact representation of that part of the meridian to which the telescope is pointed. When, therefore a star passes the middle wire, it is in the act of culminating; and the instant this occurs, it is noted on a clock, or chronometer. The time at which stars should pass any meridian, whose longitude is known, may be ascertained from the *nautical* almanack; which gives the time of their passing the meridian of Greenwich, and thus the *clock error*, in any observatory, may be determined and corrected. Finding, by the transit instrument, the exact interval of sidereal time between the transits of the different stars, we determine their right ascensions; but to ascertain the place of any star, we require to know also its *polar distance*, which is found by the *mural circle* [which see]. A transit instrument and mural circle are, therefore, indispensable to every observatory.

TRANSI'TION (*transitio*, a passing over *Lat.*), in Rhetoric, is of two kinds. The first is when a speech is introduced abruptly; as when Milton gives an account of our first ancestors' evening devotions:—

Both turn'd, and under open sky adored
The God that made both air, sky, earth
and heaven.—
——Thou also madest the night,
Maker omnipotent, and Thou the day.

The second is when a writer suddenly leaves his subject, and passes to another, which is different at first view, but which serves to illustrate what he says.——In Music, a change of key from major to minor, or the contrary.

TRANSI'TION ROCKS (same *deriv.*), in Geology, a term formerly applied to the older secondary series, from a supposition that they were formed when the world was passing from an uninhabitable to a habitable state.

TRANS'ITIVE (*transitivus*, passing over: *Lat.*), in Grammar, an epithet for a verb expressing an action which passes from the agent to an object; from the subject which *does* something, to the object on which it is *done*.

TRANSLU'CENT (*translucens*, shining through: *Lat.*), in Mineralogy, an epithet by which is designated the power of transmitting rays of light; but not so as to render objects distinctly visible.

TRANSMIGRA'TION (*transmigratio*, literally, a removing from one country to another, *Lat.*), the Pythagorean doctrine of the passing of a soul from one body into another. A belief in this, under various modifications, has existed in different ages of the world, and among various nations. In the Indian doctrine of *metempsychosis*, those who spend religious lives do not pass through different stages of existence, but proceed at once to reunion with the Supreme Being.

TRANSMUTA'TION (*transmutatio: Lat.*), the change of one substance into another of a different nature. The transmutation of base metals into gold was one of the dreams of Alchemy.——In Chemistry, the transmutation of a substance into one of a different form is both easy and common, as of a gas or liquid into a solid.——In Geometry, the change or reduction of one figure or body into another of the same area or solidity, but of a different form; as of a triangle into a square.

TRAN'SOM, in Architecture, a lintel over a door; or the piece that is framed across a double-light window.——In a Ship, the beam or timber extended across the stern-post, to strengthen the aft part, and give it due form.

TRANSPORTA'TION (*transportatio*, a conveying from one place to another: *Lat.*), in Law, a banishment inflicted for crime. Various localities have, at different times, been selected for this purpose; and returning before the sentence expired was formerly punished with death; but latterly those who did so, and such as assisted them in doing it, were transported for life. Criminals are now punished by condemnation to the penitentiary, transportation having been superseded by penal servitude. No male criminals have been sent to New South Wales or Van Diemen's Land for some time; and females have not been transported at all for many years. From whatever cause, the number of persons condemned to this kind of punishment has diminished. In the years 1850, 1851, and 1852, the number of convicts sentenced to transportation for seven years and upwards was 4,962; while, in the years 1858, 1859, and 1860, the number of sentences to penal servitude was only 2,723, of which but 515 were for periods exceeding six years. The number of prisoners in penal establishments, including Bermuda and Gibraltar, at the date of the last returns, was 8,869. The number of male prisoners received into the penal establishments of the United Kingdom, during the years 1858, 1859, and 1860 was 7,255, and during these years 2,131 were sent from Great Britain to Western Australia, Bermuda, and Gibraltar; but none were sent beyond the seas from Ireland in the same period. The Australian Colonies, generally, are unwilling to receive convicts; those sent to Bermuda and Gibraltar are employed on public works. The cost of sending criminals to Australia was found to be about 80,000*l.* per annum; to Bermuda, 65,000*l.*; and to Gibraltar, 35,000*l.*; in all 180,000*l.* It would most probably be more advantageous to the country, and even to the criminal himself, that he should be sent to a distant region. Reformations in the penitentiary are too often simulated for the purpose of obtaining a remission of punishment; and the *ticket-of-leave* system lets loose on society many persons of the very worst character. The criminal does not dread the penitentiary nearly so much as transportation; he is not sent to a remote and savage wilderness; he may sooner or later obtain an abbreviation of his punishment—and, in point of fact, if not through his own fault, he does obtain it long before the nominal term of his confinement expires. When a convict returns from transportation, he comes back being often a new man, may begin life again, and gradually may attain a respectable position—which indeed was open to him in the land of his exile. But the character of one who leaves a *jail* is ruined irretrievably; he may die of want, and he is nearly certain to join again his evil companions. Hence the commission of so many crimes by those who have been just liberated from confinement. The convict but too often quits the penitentiary more corrupt than he entered it, and far more hardened; for no system, however stringent, has yet succeeded in preventing communications between the prisoners.

TRANSPOSI'TION (*transpono*, I transfer: *Lat.*), in Algebra, the bringing any term of an equation over to the other side.——In Grammar, a change of the natural order of words in a sentence.——In Music, a change in the composition, either in the transcript or the performance, by which the whole is removed into another key.

TRANSUBSTANTIA'TION (*transubstantier*, to change from one substance into another: *Fr.*), in Theology, the supposed conversion or change of the substance of the bread and wine, in the eucharist, into the body and blood of Jesus Christ. This is a main point in the Roman Catholic religion, and is rejected by the Protestants, the former maintaining the transubstantiation to be real, the latter only figurative. The reformed churches interpret the text *hoc est corpus meum*, 'this signifies my body;' but the Council of Trent strenuously contended for the literal sense of the verb *est*, and says expressly, that by *transubstantiation* the body and blood of Christ are truly, really, and substantially present, under the species of bread and wine.

TRANSUMP'TION (*transumptio*, the assuming one thing for another: *Lat.*), in the Schools, a syllogism by concession or agreement; used where a question proposed is transferred to another, with this condition, that the proof of the latter should be admitted for a proof of the former.

TRAPE'ZIAN (from *next*), in Crystallography, having the lateral planes composed of trapeziums situated in two ranges, between two bases.

TRAPE'ZIUM (*trapezion*, literally, a small table: *Gr.*), in Anatomy, a bone of the carpus.——In Geometry, a plane figure contained under four unequal right lines, no two of them parallel.

TRAPEZOID' (*trapezion*, a trapezium: and *eidos*, form: *Gr.*), in Geometry, a plane four-sided figure, having two of the opposite sides parallel to each other. Its area is equal to half the sum of the two parallel sides, multiplied by the perpendicular distance between them.

TRAP-ROCKS (*trappa*, a flight of steps: *Swed.*), in Geology, rocks which frequently occur in large tabular masses, rising like steps, one above another. They are of volcanic origin, and are composed of felspar, augite, and hornblende; the different proportions of these constituents giving rise to many varieties. The whole family of trap-rocks have, on the one hand, a close alliance with volcanic rocks, and, on the other, with porphyry and granite. Where basalt is in contact with gneiss, it becomes nearly compact, and approaches to the character of hornstone; and where greenstone rests on sandstone or clay, these rocks have a red and burnt appearance, and a hardness superior to what they possess in other places. The trappean rocks, when free from vesicular cavities, are valuable for architecture, especially the greenstone trap, which is quarried with little expense.

TRAUMA'TIC (*traumatikos: Gr.*), belonging to wounds.——*Traumatic balsams* and certain balsams, &c., used in old pharmacy.

TRAVEL'LER, in Nautical affairs, a ring or hoop which slides along a space.

TRAV'ERSE (*traverser*, to cross: *Fr.*), in Fortification, a trench with a little parapet for protecting men on the flank; also, a wall raised across a work.——In Law, a denial of what the opposite party has advanced in any stage of the pleadings.——In Navigation, *traverse-sailing* is the mode of computing the place of a ship by reducing several short courses made by sudden shifts or turns, to one longer course.——*Traverse-board*, a small board to be hung up in the steerage of a ship, and bored full of holes upon lines, showing the points of compass. By moving a peg on this, the steersman keeps an account of the number of glasses a ship is steered on any part.——*Traverse-table*, a table used for finding the difference of latitude and departure.

TRAV'ERTIN (*Ital.*), a calcareous stone deposited by springs of water holding lime in solution by an excess of carbonic acid or by heat. It is found in many parts of Italy, where the compacter forms of it are used as building stone [See TUFA.]

TRAVES'TY, or TRAVES'TIE (*travestir*, to disguise: *Fr.*), the burlesque imitation of an author's style and composition. Most travesties purposely degrade the subject treated; though they may be intended either to ridicule absurdity or to convert a grave performance into a humorous one.

TREAD'MILL, a mill which has been introduced into prisons, as an instrument of punishment. It has a large wheel, with steps on its external surface, upon which the criminals are placed. Their weight sets the wheel in motion, and they maintain themselves in an upright posture, by means of a horizontal bar fixed above them, which they hold. The exercise is very fatiguing, and the prisoners have a short respite after being on the wheel for about ten minutes.

TRE'ASON (*trahison: Fr.*), in Law, is divided into *high treason* and *petty treason*. High treason is the greatest crime of a civil nature of which a man can be guilty. In general it is the offence of attempting to subvert the government of the state to which the offender owes allegiance; or of attempting, imagining, or compassing the life of the sovereign, the queen consort, of the heir-apparent of the crown, and certain other serious crimes of a like nature. Treason must be prosecuted within three years from its commission. Information for open and advised speaking must be given within six days. In England, those convicted of treason are usually hanged and afterwards beheaded, the more barbarous and revolting part of the sentence, namely, emboweling and quartering, being dispensed with. But a conviction of treason is visited by forfeiture of lands and goods to the crown, and attainder of blood. This, however, may afterwards be reversed. In treason, all are principals.——*Petty Treason* is the crime of a wife killing her husband, or a servant his master, crimes which are now treated as murder.

TREAS'URER (*tresor*, treasure: *Fr.*; from *thesauros: Gr.*), in Law, an officer to whose care the treasure of the state or of any company is limited.—The *Lord High Treasurer of England* was formerly the third great officer of the crown, but the appointment is now filled by five persons, styled 'the Lords Commissioners of the Treasury;' one of whom is the Chancellor of the Exchequer. The first Lord is usually Prime Minister.

TREAS'URE-TROVE (*trouver*, to find: *Fr.*), in Law, money or any other treasure found secreted under the earth. It belongs to the sovereign or some other who claims by the royal grant, or by prescription. When the owner is unknown coins or other articles found on the surface of the ground, or such things if originally lost by the owner, do not come within the denomination or law of treasure-trove.

TREB'LE, the highest or most acute of the parts in music, and adapted to the voice of females or boys. It is divided into the first or highest treble, and the second or low treble. Half treble, or *mezzo soprano*, is a high counter-tenor.

TREE, a name given to those plants which have permanent woody stems, and rise to the height of 20 feet at least. Some trees live to a great age; some British yews are thought to be from 1200 to 3200 years old. But some specimens of the Baobab, an African tree, are supposed to be 5000 years old.——Groves and woods, in the first ages, were resorted to as temples; and particular trees were supposed to be the residence of certain divinities; thus the Dryads and Hamadryads were believed to be enshrined in oaks. The gods are also said to have taken particular species of trees under their protection. Jupiter, we are told, chose the oak, Venus the myrtle, Apollo the laurel, Cybele the pine tree, Hercules the poplar, Minerva the olive, and Bacchus the ivy and the vine.

TREE-NAIL, a long wooden pin, used in fastening the planks of a ship to the timbers.

TREE-FROG, a small species of frog in North America, which is found on trees, and croaks chiefly in the evening. It differs from the common frog in having the extremity of each toe widened and rounded in a viscous palette which enables them to adhere to the surfaces of bodies.

TRE'FOIL (*trifolium: Lat.*), in Botany, the common name of many plants with ternate leaves: thus the *Trifolium repens*, or white trefoil; *Trifolium minus*, or yellow trefoil; *Medicago lupulina*, or black trefoil; *Lotus corniculatus*, or bird's foot trefoil, &c. They are all used as food for cattle.

TREL'LIS (*treillage: Fr.*), in Gardening, a frame of cross-barred work, or lattice-work, used for supporting plants. It differs from *treillage*, which consists of light posts and rails for supporting espaliers, and sometimes for wall trees.

TREM'OLITE, a mineral of a fibrous texture originally found in the valley of Tremola, on St. Gothard. It consists generally of silica, magnesia, and carbonate of lime.

TRENCHES, or *lines of approach*, in Fortification, ditches cut in oblique zigzag directions, to enable besiegers to approach a fortified place without being exposed to the fire of its cannon. Hence the terms to *open the trenches*, or to break ground for the purpose of carrying on approaches to a besieged place; *mount the trenches*, or to mount guard in the trenches, &c.

TREPANG', an eastern word imported into commerce, signifying a worm-like echinoderm distantly related to the star-fishes and sea hedgehogs. Several species of *Holothuria* are collected in the Indian archipelago, where there are extensive fisheries of the animal, and after being dried are sent to China, where they are employed for culinary purposes, forming one of the dainties of a Chinese table along with birds' nests and sharks' fins. Animals of the same nature are found round our own coasts.

TREPAN'NING (*trepaner*, to trepan: *Fr.*), in Surgery, the operation of perforating the skull and taking out a piece, for relieving the brain from pressure, &c. The instrument used is called a *trepan*. [See TREPHINE.]

TREPH'INE, in Surgery, a more modern instrument than the *trepan* for performing the operation of trepanning. It is a circular or cylindrical saw, with a handle like that of a gimlet, and a little sharp perforator, called the centre-pin.

TRES'PASS (*trespasser*, to transgress: *Fr.*), in Law, any violation of another's rights; as, the unlawfully entering on his premises; but when violence accompanies the act, it is called a trespass *vi et armis*.

TRI'AD (*trias*, the number three: *Gr.*), in Music, the common chord, consisting of the third, fifth, and eighth.

TRI'AL, in Law, the examination of causes before a proper judge, which, as regards matters of fact, are to be tried by a jury; as regard matters of law, by the judge: and as regards records, by the record itself. [See LAW, JURY, &c.]——*New trials*, in civil cases, are granted when the court of which the record is, sees reason to be dissatisfied with the verdict: either because evidence was improperly received or rejected, or the judge misdirected the jury as to the law which applied to the facts; or a party was unfairly surprised; or fresh evidence has been discovered.

TRIAN'DRIA (*tris*, three times; and *anēr*, a male: *Gr.*), one of the Linnæan classes, comprehending plants the flowers of which have three stamens, as the crocus, gladiolus, valerian, &c.

TRI'ANGLE (*triangulum:* from *tres*, three; and *angulus*, an angle: *Lat.*), in Geometry, a figure of three sides and three angles. Triangles are either plane or spherical. A *plane triangle* is contained under three right lines, and a spherical under three arcs belonging to great circles of the sphere. Triangles are denominated from their angles. A *right-angled triangle* is that which has one right angle; an *obtuse-angled triangle* is such as has one obtuse angle; and an *acute-angled triangle* is that which has all its triangles acute. And from their sides, an *equilateral triangle* has three equal sides; an *isosceles triangle* has two equal sides; and a *scalene triangle* has all its sides unequal. *Similar triangles* are those whose angles are equal, and corresponding sides proportional.——*Triangle*, in Music, a small triangular steel instrument, open at one of its angles; and played by striking it with a short bar of the same metal.

TRI'AS, or UPPER NEW RED SANDSTONE, in Geology, a series of strata forming the oldest division of the secondary period, and intervening, therefore, between the Permian and the Liassic groups. It has been divided into the *Upper Trias*, to which the saliferous and gypseous sandstones and slates of Cheshire belong; the *Middle Trias*, or Muschelkalk, which has no representative in Britain; and the *Lower Trias*, which includes the red and white sandstones of Lancashire and Cheshire, and the Bunter-Sandstein of Germany. This threefold division suggested the name of the group (*tria*, three: *Lat.*). All the strata appear to be marine. The salt mines of Cheshire are in the upper triassic beds.

TRIB'UNE (*tribunus*, from *tribus*, literally, the chief officer of a tribe: *Lat.*), in Roman Antiquity, the title of various officers. *A Tribune of the people* was chosen out of the plebeians to protect them against the encroachments and oppression of the patricians, and the attempts of the senate and consuls to lessen or destroy their liberty. Tribunes were first elected after the succession to the *Mons Sacer*, A.U.C. 260. They were not, strictly speaking, magistrates, or invested with magisterial powers, but they exercised a great influence upon public affairs. They had the right to put a negative on the decrees of the senate, and arrest the proceedings of magistrates by the *veto;* and in process of time their influence was increased to such a degree that they endangered the safety of the state.——*Military tribunes*, officers elected in place of the consuls; in consequence of the demand made by the common people to be admitted to a share in supreme power. They were not, however, invested with the full power and honours of the consulate; and besides, were generally selected from the patricians. There were sometimes six, and sometimes three. They were first chosen A.U.C. 310, and continued to be elected, instead of consuls, at intervals for seventy years; after which time there were only consuls, but plebeians were admissible to the office.——*Legionary Tribunes*, or tribunes of the soldiers, were the chief officers of a legion. There were six; and each in turn commanded under the consul; in battle, each led a cohort, or about 1000 men.——*Tribuni Ararii*, tribunes of the treasury.——*Tribuni Fabricarum*, those who had the direction of the making of arms.——*Tribuni Voluptatum*, intendants of the public shows, and other diversions.——*Tribune*, in ancient Architecture, the pulpit or elevated place whence speeches and addresses were delivered. In the French legislative houses the speakers address the assembly from a tribune.

TRICAP'SULAR (*tres*, three; and *capsula*, a small chest: *Lat.*), in Botany, an epithet for such plants as have three capsules to each flower.

TRICLIN'IUM (*Lat.;* from *triklinion: tries*, three; and *klinē*, a couch: *Gr.*), a name given by the Greeks to the room where they supped, because three couches were placed about the table. This name was adopted by the Romans as synonymous with *Cœnaculum*. *Triclinium* is sometimes used for the couch, on which the guests reclined.

TRI'COLOR (*tres*, three; and *color*, a colour: *Lat.*), the national French banner of three colours (blue, white, and red), selected as the emblem of the first revolution. The *Tricolor* has been adopted by Belgium, and is often used as emblematical of liberty.

TRICUS'PIDATE (*tricuspis*, having three points: *Lat.*), in Natural History, an epithet for anything ending in three points.

TRI'DENT (*tridens*, literally having three teeth: *Lat.*), an attribute of Neptune; being a kind of three-pronged sceptre which the fable of antiquity put into the hands of that deity.——*Trident*, among Mathematicians, a kind of parabola, by which Des Cartes constructed equations of six dimensions.

TRIDODECAHE'DRAL (*treis*, three; *dodeka*, twelve; and *hedera*, a base: *Gr.*), in Crystallography, presenting three ranges of faces, one above another, each containing twelve.

TRI'FID (*trifidus*, three cleft: *Lat.*), in Botany, divided into three parts by sinuses with straight margins.

TRIFO'LIATE (*tres*, three; and *folium*, a leaf: *Lat.*), in Botany, having three leaves.

TRIFO'LIUM (same *deriv.*), in Botany, a genus of leguminous plants, including the clovers and some of the trefoils.

TRI'GAMOUS (*treis*, three; and *gamos*, marriage: *Gr.*), a name given by some Botanists to plants containing three kinds of flowers in the same flower-head: males, females, and hermaphrodites.

TRIG'LYPH (*trigluphos*: from *treis*, three; and *gluphē*, a carving: *Gr.*), in Architecture, a member of the Doric frieze, repeated at equal intervals. It consists of two whole, and two half channels, separated by flat spaces, termed *femora*.

TRIGONOM'ETRY (*trigōnon*, a triangle; and *metreo*, I measure: *Gr.*), the art of measuring the sides and angles of triangles. A triangle contains three sides, and three angles; when we know any three of these including, in plane trigonometry, at least one side, the others can be found. Angles are *given*, if their *sines*, &c., are *given*. When this science is applied to the solution of plane triangles, it is called *plane* trigonometry; when to spherical triangles, *spherical* trigonometry. Trigonometry is a most important branch of knowledge. Plane trigonometry enables us to measure, with great ease, inaccessible heights and distances, &c. Spherical trigonometry is indispensable to the astronomers. The Greek astronomers of Alexandria were the inventors of trigonometry.

TRIJU'GOUS (*tres*, three; and *jugum*, a pair: *Lat.*), in Botany, having three pairs. A *trijugous* leaf is a pinnate leaf with three pair of leaflets.

TRIL'LION, in Arithmetic, a thousand times a thousand millions; that is unity in the lowest place of the fifth period to the left of the decimal point. It is very often, though erroneously, considered as a million times a million of millions.

TRIL'OBITES (*treis*, three; and *lobos*, a lobe: *Gr.*), an order of Crustaceans only found in the fossil state, in palæozoic strata; having a body composed of a series of rings and longitudinally divided by two furrows into three lobes. They had a head, a thorax, and an abdomen more or less distinct, and they had a pair of large compound eyes. They were nearly allied to some of the existing *Phyllopoda*. Their food was the smaller aquatic animals, and they lived in vast numbers in the vicinity of coasts in shallow water.

TRIL'OGY (*treis*, three; *logos*, a discourse: *Gr.*), a set of three dramas relating to the same series of events. The three parts of Shakespeare's Henry VI. form a trilogy. The Orestes, Iphigenia in Tauris, and Andromache of Euripides, afford another example.

TRIM'MER, in Architecture, a piece of timber framed at right angles to the joists which are opposite to chimneys, to the well holes of stairs, &c. It receives the ends of the joists, intercepted by the opening.——*Trimming joist*, a joist into which a trimmer is framed.

TRIM'YARIES (*treis*, three; and *mūn*, a muscle: *Gr.*), those bivalves which present three muscular impressions on each valve.

TRINE (*trini*, a set of three: *Lat.*), in Astrology, the aspect of planets placed in three angles of a triangle; in which position they were supposed to be eminently benign.

TRIN'GA, in Ornithology, a genus of grallatorial birds. They have a hind toe; though it is too short to reach the ground; and, in this, are unlike the plovers, in which the hind toe is generally wanting. There are several British species, including the knot, dunlin, stints, and sandpipers.

TRIN'GLE (*Fr.*), in Architecture, an ornament, fixed exactly over every triglyph, under the platband of the architrave. The guttæ or pendant drops hang down from it. ——Also, other small square members.

TRIN'ITY HOUSE, a society incorporated by Henry VIII. in 1515, for the promotion of commerce and navigation, by licensing and regulating pilots, ordering and erecting beacons, light-houses, &c. This corporation is governed by a master, four wardens, eight assistants, and thirty-one elder brothers; besides numerous inferior members of the fraternity, named younger brethren. Many valuable privileges are attached to it, and its revenue amounts to about 140,000*l.* per annum. The hall of the Trinity House is an elegant building, not far from the Tower of London.

TRINO'MIAL (*tres*, three; and *nomen*, a name: *Lat.*), in Mathematics, an epithet for any quantity or root consisting of three terms, united by the sign of addition or subtraction: thus $a + bc - d$.

TRIO (*Ital.*), in Music, a composition consisting of three parts: one of which must make a third with the base, and the other a fifth or octave.

TRIOCTAHE'DRAL (*treis*, three; *oktō*, eight; and *hedra*, a base: *Gr.*), in Crystallography, presenting three ranges of faces, one above another, each range containing eight faces.

TRIŒ'CIA (*treis*, three; and *oikia*, a family: *Gr.*), in Botany, the name of the third order in Linnæus's class *Polygamia:* comprehending such plants as have hermaphrodite (male and female) flowers of the same species, in three distinct individuals.

TRIOLET, a stanza of eight lines, in which, after the third, the first line, and after the sixth, the first two lines, are repeated; so that the first line is heard three times.

TRIO'NES (*Lat.*, literally, the ploughing oxen), in Astronomy, a name for the cluster of seven stars in Ursa Minor, called also *Charles's Wain.*

TRIP'ARTITE (*tripartitus: Lat.*), in Botany, an epithet for a leaf which is divided into three parts down to the base, but not wholly separate.

TRIPE DE ROCHE (*Fr.*), species of lichen belonging to the genus *Gyrophora*, found in arctic regions, upon which famished voyagers are sometimes compelled to feed, and they are frequently the food of Canadian hunters.

TRIPET'ALOUS (*treis*, three; and *petalon*, a leaf: *Gr.*), in Botany, having three petals or flower leaves.

TRIPH'THONG (*treis*, three; and *phthongos*, a sound: *Gr.*) in Grammar, a coalition of three vowels in one compound sound, or in one syllable; as in *adieu*, *beau*.

TRIPIN'NATE, in Botany, an epithet for a species of compound leaf; when a petiole has bipinnate leaves ranged on each side of it.

TRIP'LET, in Poetry, three verses rhyming together.——In Music, notes grouped by threes; when the figure 3 is placed over them they are to be played in the time of two.

TRIP'LE TIME, in Music, a time in which each bar can be divided into three parts. [See TIME.]

TRIPLICATE RATIO (*triplico*, I multiply by three: *Lat.*), in Arithmetic, &c., the ratio of the cubes, of the terms of a simple ratio; thus, $a^3 : b^3$ is the triplicate ratio of $a : b$.

TRIP'OD (*treis*, three; and *pous*, a foot: *Gr.*), in general, anything having three feet.——In Grecian Antiquity, the sacred seat, supported by three feet, on which the priestesses among the ancients used to deliver the oracles.

TRIP'OLI, in Mineralogy, a silicious mineral, originally brought from Tripoli; used in polishing stones and metals. It has a dull argillaceous appearance, but is not compact. It has a fine hard grain, but does not soften by water, or mix with it. The various kinds of Tripoli have been found to consist of the silicious coats of minute organisms, chiefly vegetable.

TRIP'TOTE (*triptōtos: Gr.*), in Grammar, having three cases only.

TRIPYR'AMID, in Mineralogy, a genus of spars, the body of which is composed of single pyramids, each having three sides, and affixed by their base to some solid body.

TRIQUET'ROUS (*triquetrus*, having three corners: *Lat.*), in Botany, an epithet for a fruit or leaf that has three plane sides or faces.

TRIRE'MIS, or TRI'REME (*tremis: Lat.*), in Greek and Roman Antiquity, a galley with three tiers or banks of oars. The rowers are supposed to have been placed on seats one over another, the two lower being separated by a deck.

TRI'SECTION OF AN ANGLE, in Geometry, a problem of great celebrity among ancient mathematicians. An acute or obtuse angle cannot be trisected by plane geometry; but it may be done by means of the conic sections, and some other curves.

TRISMUS (*trizo*, I grind the teeth: *Gr.*), in Medicine, the *lock-jaw.* One species is caused by wounds, or exposure to cold; the other attacks infants during the first two weeks after birth.

TRITER'NATE (*tres*, three; and *terni*, three each: *Lat.*), in Botany, having three biternate leaves; or the divisions of a triple petiole, subdivided into threes.

TRITH'EIST (*treis*, three; and Theos, a God: *Gr.*), in Theology, one who believes that there are three distinct Gods in the Godhead; that is, three distinct substances and essences.

TRIT'ICUM (*Lat.; from tritus*, ground, on account of the mode of preparing it for food), a genus of plants, nat. ord. *Graminaceæ*, to which wheat belongs.

TRI'TON, in the Greek Mythology, a kind of demi-god, half man and half fish. ——*Triton*, in Malacology, a genus of marine molluscs inhabiting univalve shells.

TRI'TONE (*tritonos*, consisting of three tones: *Gr.*), in Music, an interval now usually called a *sharp fourth*; it consists of four degrees, and contains three tones between the extremes. It is divisible also into six semitones: three of them being diatonic and three chromatic.

TRITOX'IDE, in Chemistry, an oxide containing one atom of base and three of oxygen.

TRITURA'TION (*trituratio: Lat.*), in Pharmacy, the act of reducing a solid body into a fine powder; called also *levigation* and *pulverization.*

TRI'UMPH (*triumphus: Lat.; from thriambos*, originally a hymn to Bacchus: *Gr.*), in Roman Antiquity, a public and solemn honour conferred by the Romans on a victorious general; by allowing him a magnificent procession through the city. The triumph was of two kinds, the greater and the less; the latter of which was called an *ovation*. This splendid spectacle was arranged as follows: the whole senate went out to meet the victor, who, being seated in a gilded chariot, sometimes drawn by white horses, and clad in his gold embroidered triumphal robes, was preceded by the kings, princes, and generals whom he had vanquished, loaded with chains, as well as by singers and musicians; and was followed by carefully selected victims, and by the spoils and emblems of the conquered cities and provinces. Lastly came the victorious army, horse and foot, crowned with laurel, and adorned with the marks of distinction they had received, shouting *Io triumphe*, and singing songs of victory, or of sportive raillery. Upon the capitol, the general rendered public thanks to the gods for the victory; caused the victims to be slaughtered; and dedicated the crown which he wore, and a part of the spoils, to Jupiter. All the temples were open, and all the altars loaded with offerings and incense; games and combats were celebrated in the public places; the general gave a costly feast, and the shouts of the multitude rent the air with their rejoicings.

TRIUM'PHAL ARCH, a grand gate, or archway, erected at the entrance of a town, or in some other public situation, in commemoration of some important event, or in honour of some victorious general. It sometimes consisted of one, at others of two or three, openings; the last kind being the most beautiful. Among the remains of antiquity, Italy can boast of the relics of several triumphal arches; and many beautiful structures of the kind have been erected in modern times.

TRIUMPHALIS CORONA. [See CROWN.]

TRIUM'VIRATE, an absolute government administered by three persons, named *Triumvirs* (*triumviri*, three men: *Lat.*), with equal authority; as that of Augustus, Marc Antony, and Lepidus; which gave the last blow to the Roman republic. For Augustus having vanquished Lepidus and Antony, the triumvirate was soon converted into a monarchy.

TRIVIUM (a place where three roads meet: *Lat.*), a name given in the middle ages to the three liberal arts, grammar, rhetoric, and logic, which were studied together. The other four, arithmetic, music, geometry, and astronomy, being called *quadrivium*.

TROCAR' (*Fr.*), in Surgery, an instrument for making incisions; particularly in the operation of tapping for the dropsy.

TROCHAN'TER (*trōchazo*, I gallop: *Gr.*), in Anatomy, a name given to two apophyses, situated in the upper part of the thigh-bone; they receive the tendons of most of the muscles of the thigh. The *major* process is on the outside, and the *minor* on the inside of the thigh. They receive their name from being chiefly concerned in the act of running.

TRO'CHE (*trochos*, anything round: *Gr.*), a small lozenge or cake, generally consisting of sugar and mucilage, with small quantities of more active substances, and intended to be gradually dissolved in the mouth.

TRO'CHEE (*trochaios;* from *trochos*, a running: *Gr.*), in Greek and Latin poetry, a foot consisting of two syllables, the first long, and the second short.

TRO'CHILUS (*trochilos: Gr.*), in Architecture, a name used by the ancients for a hollow ring round a column, which the moderns call *scotia*.——*Trochilus*, in Ornithology, a genus of *Humming birds*, which see.

TRO'CHITE (*trochos*, anything round: *Gr.*), in Natural History, a kind of figured fossil stone resembling parts of plants, called St. Cuthbert's beads. Trochites are usually of a brownish colour, and break like spar.

TROCH'LEA (a pulley block: *Lat.*), in Anatomy, a cartilage through which the tendon of the trochleary muscle passes.——The *trochleary muscle* is the superior oblique muscle of the eye; the *trochleary nerve*, the nerve which goes to that muscle.

TROGLOD'YTES (*trōglodutes;* from *trōglē*, a hole; and *duo*, I go into: *Gr.*), certain tribes in Ethiopia who are represented by ancient writers as living in subterranean caverns; and respecting whom we have many fabulous stories.

TROM'BONE (*Ital.*), a musical instrument, of which there are three kinds: the bass, the tenor, and the alto. It is extremely powerful; and therefore best suited to grand choruses and other full compositions.

TROOP (*troupe: Fr.*), in Cavalry, a certain number of soldiers mounted, who form a component part of a squadron. It is the same, with respect to formation, as *company* in the infantry.——The word *troops* (in the plural) signifies soldiers in general, whether more or less numerous, including infantry, cavalry, and artillery.

TROPE (*tropos;* from *trepo*, I alter: *Gr.*), in Rhetoric, an expression used in a different sense from that which it properly signifies. It is intended to present an idea in a lively and forcible manner.

TRO'PHY (*tropaion: Gr.*), anything taken and preserved as a memorial of victory; as arms, standards, &c., taken from an enemy. It was customary with the ancients to erect their trophies on a spot where they had gained a victory. At first they consisted of the arms they had taken; but afterwards trophies were formed of bronze, marble, or even gold.——In Architecture, an ornament representing the stem of a tree, charged or encompassed with military weapons.

TRO'PICS (*tropikos*, belonging to a turning round: *Gr.*—the line at which the sun turns back), in Geography, a zone of the earth, 23½ degrees, or about 1600 miles on each side of the equator, over some part of which the sun passes directly vertical two days in the year. It is the hottest, wettest, and most fertile part of the earth; but is less favourable to human life than the temperate zones. Its heats are, however, tempered by winds which constantly follow the sun from east to west, and which, from their convenience to ships, are called *Trade Winds*. In the plains the heat varies from 120 to 80 degrees, and is seldom below 65 ——In Astronomy, parallels of declination drawn through the solstitial points. There are two tropics; the tropic of Cancer, on the north of the equator, and the tropic of Capricorn on the south; each is 23½° from the equator.

TROU'BADOURS, poets who flourished in Provence, from the 11th to the latter end of the 13th century. They wrote poems on love and gallantry; on the illustrious characters and remarkable events of the times, &c., which they set to music and sung: they were accordingly general favourites in different courts, diffused a taste for their language and poetry over Europe, and essentially contributed towards the restoration of letters, and a love for the arts. Each baron, a sovereign in his own territory, invited the neighbouring knights to his castle to take parts in tournaments and to contend in song; at a time when the knights of Germany and Northern France were challenging each other to deadly combat. Thus the verse of the Provençals was lyrical in the highest degree; but it was necessarily superficial, and would lose its chief value if unaccompanied by music. In the 11th and 12th centuries it had attained its highest celebrity; it had spread into Spain and Lombardy; and even German emperors (Frederic Barbarossa), and English kings (Richard Cœur de Lion), composed songs in the Provençal dialect. But the poetry of the Troubadours, as in the course of time it became more common, became degraded to mere ballad-singing; and the few specimens of it that have been preserved, consist of short war-songs and lyrics of pastoral life and love. [See PROVENÇAL.]

TROUT, the *salmo fario* of ichthyologists, in the family *Salmonidæ*, a delicate fish, abounding in many of the rivers of England. It frequents the clearest streams, and has always been the favourite sport of the angler. Trout are prettily coloured, the back being mottled, and the sides dark brown, with yellow spots, which have a scarlet dot in the centre. They seldom exceed four pounds in weight; and are generally between one and two pounds.

TRO'VER (*trouver*, to find: *Fr.*), in Law, a special action upon the case, which may be maintained by any person who has either an absolute or special property in goods, for recovering the value of such goods, against another who, having, or being supposed to have obtained possession of them by lawful means, has converted them to his own use.

TROY'-WEIGHT, the weight by which gold and silver, jewels, &c., are weighed. It is also used in weighing medicines, in experiments in natural philosophy, and in comparing different weights with each other. The pound contains 12 ounces, or 5,760 grains.

TRUCE OF GOD, a suspension of hostilities, often proclaimed during the middle ages, on the authority of the church. It afforded an interval of peace amid those private hostilities, in which every petty baron believed it his right to engage.

TRUCK, the small wooden cap, at the extremity of a flagstaff, or masthead.

TRUCK SYSTEM (*troc*, to give in exchange: *A. Sax.*), a name given to a mode, at one time very prevalent in manufacturing districts, of the employer paying his workmen in provisions, clothes, and other goods, instead of money. In favour of this practice it was argued, that the manufacturer, having the command of capital, was enabled to establish shops, or general *depôts*, from which the working man could supply his family with necessaries at the cheapest rate. But the mechanic had often to pay exorbitant prices for the articles he was compelled to purchase, and was subject to every species of unfair dealing and tyranny by such a system; and, after much discussion, an act was passed for its suppression.

TRUFFLES (*truffe: Fr.*), fungi growing underground, and much prized as condiments in cookery. They are difficult to find; but as the commoner species, belonging to the genus *Tuber*, have a peculiar smell, dogs are trained to discover them. They are usually found in calcareous soil, and are more abundant in France than in England, and still more plentiful in Italy.

TRUM'PET, the loudest of all portable wind instruments, consisting of a tube, generally of brass.——*Hearing trumpet*, or ear trumpet, an instrument, which is used to enable deaf persons to hear sounds, that would otherwise be inaudible to them; it collects and conveys to their ears waves of sound, which would pass off in other directions. It is constructed on the same principle as the speaking trumpet; and, indeed, is that trumpet reversed; though, for convenience, it is often made curved or spiral. ——*Speaking trumpet*, a tube, from six to fifteen feet in length, made of tin, perfectly straight, and having a very large aperture; the mouth-piece being wide enough to admit both lips. By means of this instrument the voice is carried, with distinctness, to the distance of a mile or more. It is used chiefly at sea. The aërial undulations, which would disperse themselves in all directions, are confined by the sides of the instrument; and reflected in a direction parallel to its axis.—— *The feast of trumpets*, a festival among the Jews, observed on the first day of the seventh month of the sacred year, which was the first of the civil year, and answered to our September. The beginning of the year was proclaimed by sound of trumpet.

TRUM'PETER, or *Agami*, the *Psophia crepitans* of ornithologists, a bird of the heron family, which inhabits tropical South America. Its name is derived from its cry. It is easily tamed, and becomes as attached to its owner as a dog.

TRUN'CATE (*truncatus*, mutilated: *Lat.*), in Botany, appearing as if cut off at the tip: as, a *truncate* leaf.

TRUN'NIONS, two knobs which project from the opposite sides of a piece of ordnance, whether gun, mortar, or howitzer; and serve to support it on the cheeks of the carriage.——The *trunnion-ring*, is that ring on a cannon which is next in front of the trunnions.

TRUSS (*trousse*, a bundle: *Fr.*), in Architecture, a framed collection of pieces of timber. [See ROOF.]——In Navigation, a machine to pull a lower yard close to its mast, and retain it firmly in that position. ——In Carpentry and Engineering, a triangular frame used as a support, or a polygonal frame made rigid at the joints and employed for the same purpose.——A bundle of hay or straw, equal to 56 lbs.; six trusses make a *load*.——In Surgery, a bandage or apparatus used in cases of rupture, to keep up the reduced parts, and hinder further protrusion; and for other purposes.

TRUSTEE', in Law, one to whom is confided the care of an estate, money, or business, for the benefit of another.

TRYSOLYMPON'ICA (*Gr.*; from *treis*, three; *Olumpia*, the Olympic games; and *nikē*, a victory), in Antiquity, one among the Greeks who returned three times victorious from the Olympic games; and on whom special honours were conferred by the state.

TU'BA (*Lat.*), a wind instrument, used by the ancient Romans, resembling our trumpet; though of a somewhat different form.

TUBE (*tubas: Lat.*), a hollow cylinder, either of wood or metal, used for the conveyance of fluids, &c. Also, a vessel of animal bodies or plants, which conveys a fluid or other substance.——In Botany, the narrow hollow part of a monopetalous corolla, by which it is fixed to the receptacle.

TU'BERCLES (*tuberculum*, a small swelling: *Lat.*), in Medicine, little tumours which suppurate and discharge pus.——In Natural History, little knobs or rough points. Hence the epithet *tuberculate*.

TU'BEROSE, the *Polyanthes tuberosa* of botanists, a liliaceous plant with white strongly scented flowers, well known in our greenhouses. It is a native of the East Indies, and yields a scent to the perfumer.

TU'BEROUS, in Botany, consisting of roundish fleshy bodies, or tubers; as the roots of artichokes and potatoes.

TU'BULAR BRIDGE, a bridge formed of a great tube or hollow beam, through the centre of which a roadway or railway passes. The first iron bridge of this kind was that designed by Stephenson, for carrying the Chester and Holyhead railway over the Menai Straits. It consists of two rectangular tubes of wrought iron plates, riveted together; one tube being for the accommodation of the up line of rails, and the other for that of the down line. A pier erected upon a rock in the middle of the Straits divides each tube into two spans of 462 feet each, and there is also at each end a smaller tube of 230 feet span to serve as approaches to the bridge. These several tubes are joined together, so as to form one tube for each line of rails, 1524 feet long: and 100 feet above high water. The thickness of the central pier is 45 feet, that of each side pier 32 feet; the tube projects 17 feet 6 inches over the masonry at each end, and rests on rollers, to permit motion, when the tube expands or contracts from change of temperature. This bridge contains 9480 tons of wrought iron, 1988 tons of cast iron, and 1,500,000 cubic feet of masonry. The total expense of its construction was 601,860*l*. It was commenced Aug. 10, 1847, was finished March 5, 1850, and was opened for traffic March 18, 1850. A similar bridge, containing one length of tube, and of a somewhat smaller span, had been previously erected, under Stephenson's direction, over the river Conway, on the same line of railway, and was opened for traffic in 1848. These bridges have, however, been far surpassed by the Victoria tubular bridge over the river St. Laurence, in Eastern Canada. It consists of one tube 6592 feet, or nearly two miles in length: the whole bridge being 9145 feet long. It is 60 feet over the water; has 24 openings, of which the centre one is 332 feet wide, and each of the others 242. The tube is 19 feet high at the centre, 16 feet wide: and contains 9044 tons of wrought iron; with 1,540,000 rivets. Its surface for painting is equal to 32 acres. It is supported on 24 piers; the two central ones being 18 feet wide; and the remaining 22, 15 feet, and altogether with the abutments, containing 2,713,095 cubic feet of masonry. Their strength was required to be enormous; since the ice accumulated during a Canadian winter, on 2000 miles in length, of lakes and mighty rivers, must pass through them, and a large portion of it dash against them. This ice exerts an almost incalculable pressure; and is often piled up to the height of 40 or 50 feet where there is no obstruction—one vast mass sliding up on another. Wooden tubular bridges have long been in use. One was built at Wettingen in 1778, which may be considered as a hollow timber beam: its span was 390 feet. After whole armies, with the artillery, &c., had passed over it in safety, as also a constant traffic for more than 20 years, it, as well as a similar bridge at Schaffhausen, was burned by the French in 1799.

TU'BULOUS, or **TU'BULATED** (*tuba*, a trumpet: *Lat.*), in Botany, having a bell-shaped border; with five reflex segments, rising from a tube: as, a *tubulous* floret.

TU'ESDAY, the third day of the week; answering to the *dies Martis* of the Romans; but dedicated by the Saxons to *Tuisco*.

TU'FA, or **TUFF**, in Geology, a rock composed of small particles of stone, which issued in the shape of dust from a volcano; or as mud, that is, dust mingled with steam. In volcanic countries there are strata of tuffs, some of which had been originally thrown into the sea, and contain marine organic remains; others have been penetrated by water, holding calcareous matter in solution, by which the tufaceous particles have been bound together into a hard mass susceptible of a good polish. Tuffs frequently alternate with beds of basalt and trachyte.

TUFO, in Architecture, a porous, light, calcareous stone, used in the construction of vaults. The '*travertin*' employed in building St. Peter's, at Rome, is of this nature. [See TRAVERTIN.]

TUILERIES (*tuillerie*, a place where tiles are made: *Fr.*), the residence of the French monarchs, on the right bank of the Seine, in Paris. It was begun by Catherine de Medici, wife of Henry II., in 1564, and finished by Henry IV.; but the latest additions were made to it by Napoleon, in 1808. It has been connected by Napoleon III. with the Louvre, forming a splendid pile of buildings. The exterior of the Tuileries is deficient in harmony, having been built at different times, and on very different plans; but the interior is magnificent. It derives its name from having been erected on a place where tiles were anciently manufactured.

TU'LIP (*tulipe: Fr.*), the name of liliaceous plants belonging to the genus *Tulipa* of botanists. They are much cultivated for the regular form and gay colours of their flowers. The tulip has always been a favourite flower with the Belgians and Dutch; and, about a century after its introduction, the mania prevailed to such an extent in those countries, that more than two thousand dollars were often given for a single root.

TU'LIP-TREE, a North American tree belonging to the *Magnolia* order. It is the *Liriodendron tulipiferum* of botanists. The deciduous leaves have a singular shape. The flowers are large and showy, are variegated with different colours, among which yellow predominates; and sometimes resemble those of the tulip. In parts of the United States it constitutes alone very considerable tracts of the forest, and has been found 140 feet high, with a stem 20 feet in circumference. The heart of the wood is of a light yellow colour, and the sap white; the grain is fine and compact; it is easily wrought, polishes well, and is sufficiently strong for purposes requiring great solidity. The tree succeeds very well in England.

TU'MOUR (*tumor*, a swelling: *Lat.*), in Medicine, the morbid enlargement of a particular part; without being caused by inflammation.

TU'MULUS (*Lat.*), a *barrow* or mound of earth in ancient times raised to the memory of the dead. [See BARROW.]

TUN (*tunne: Sax.*), a measure of capacity for liquids. The English tun contains two pipes, or four hogsheads, or 252 gallons.

TUNG'STEN (*tung sten*, heavy stone: *Swed.*), sometimes called Wolframium, a white, hard, and brittle metal, very difficult of fusion; heated to redness, in the open air it burns into the peroxide or tungstic acid. Its spec. grav. is 17·4. It is obtained chiefly from *wolfram*, or tungstate of iron and manganese. Steel is supposed to be greatly improved by the addition of from two to five per cent. of tungsten. Tungstate of soda is employed to render articles of dress uninflammable.

TU'NIC (*tunica: Lat.*), a garment worn within doors by the Romans of both sexes, under the toga; the slaves and common people only appearing in it abroad, in which case it was girded with a belt. The senators wore a tunic with a broad stripe (*clavus*) of purple: the knights had narrow stripes on theirs: and hence the terms *Laticlavii* and *Angusticlavii* applied to persons of these orders. The *Latus clavus* extended from the neck perpendicularly down the centre of the tunic, and, being *woven* in the cloth, it is not represented on statues. The *clavus augustus* consisted of two narrow stripes, also in front of the tunic, and reaching from each shoulder to the bottom; the right of wearing it was permitted also to the children of knights.——*Tunic*, in Anatomy, a coat of membrane.

TU'NICATED (*tunicatus: Lat.*). In Zoology, the term is applied to an order of molluscs, amongst which are the sea-squirts, in consequence of their being protected by an elastic tunic in place of a shell. These are the ascidians of zoologists.——In Botany, an epithet for a bulb composed of numerous concentric coats; as an onion.

TUN'NEL, a subterraneous passage. Some tunnels are cut through hills, to continue the lines of canals, from half a mile to two or three miles long; others are formed on the lines of railroad, where steep hills render them necessary.——The tunnel under the Thames, below London Bridge, was commenced in 1826; and finished for passengers in 1843. It consists of two double archways, each 1300 feet in length; and communicating by openings, cut in the massive centre wall. It cost about 1200*l.* per yard. There have been some enormous tunnels constructed for canal and railway purposes. That on the Thames and Medway Canal, finished in 1800 and now used for the North Kent railway, is 3160 yards in length; and the Box tunnel, on the Great Western Railway, finished in 1838, 3123 yards. But the most enormous undertaking of the kind is that now forming through Mont Cenis, intended to connect France and Italy. It will be 7 $\frac{8}{10}$ miles long, with a width at the base of the arch of 25½ feet, and a height varying from 24½ to 25½ feet. The tunnel has been commenced at each end, and several years must elapse before it is finished, the whole having to be carried through hard rock. Tunnels have been made in very ancient times. The Grotto of Pausilippo, through which the road passes from Baiæ to Naples, is of considerable length, and is probably artificial. Semiramis is said to have made a tunnel under the Euphrates at Babylon more than 3000 years ago.

TUR'BAN (*turband: Pers.*), a head-dress worn by most Oriental nations. It is of very various forms, but generally consists of a piece of fine cloth or linen wound round a cap, which is red or green, roundish on the top, and quilted with cotton. The Turkish sultan wears a turban having three heron's feathers, with many diamonds and other precious stones. The turban of the grand vizier has two heron's feathers; that of other officers, but one.

TUR'BARY, in Law, the right of digging turf on another man's land. *Common of turbary*, is the liberty which a tenant enjoys of digging turf on the lord's waste.

TUR'BINATED (*turbinatus*, conical: *Lat.*), in Botany, shaped like an inverted cone; narrow at the base, and broad at the apex.——In Conchology, wreathed conically from a broad base to a narrow or pointed apex. The top shells afford examples of this form.

TURBINE (*turbo*, a top: *Lat.*—because the machine turns round on a vertical axis something like a *top*), an hydraulic machine, in which the water, having a considerable pressure due to the height of its fall, is allowed to issue through small orifices with a high velocity. The simplest, and probably the oldest form, is what is usually termed *Barker's mill;* it may be described as a vertical tube, having two horizontal tubular arms at its lower extremity; being in the form of an inverted T, and capable of revolving on its vertical axis. There is an aperture near its outer extremity, of each horizontal arm, at opposite sides; or the arms are bent round, so that apertures in the extremities are turned in opposite directions. Another form of turbine has the water flowing from the circumference towards the centre, not as in the preceding form, from the centre to the circumference. When the water flows through the apertures, the parts of the interior immediately opposite to them are acted upon by an *uncounteracted* pressure; which causes a rapid motion in a direction opposite to that towards which the water flows. This rotatory motion of the apparatus is communicated to mill stones, &c. Improved modifications of the turbine, in the shape of *horizontal water-wheels*, are now used. In these, the water is made to traverse curved passages, and by its pressure, while passing through them, it moves the wheel round. They assume a great variety of forms; but will be easily understood, if the principles just alluded to are borne in mind. Turbines are applicable, when the fall of water is too high, and too inconsiderable, for ordinary vertical water-wheels.

TUR'BITH, or TUR'BETH (*turpethus: Mod. Lat.*), a substance used in the materia medica as a cathartic. It is brought from the East Indies, and is the cortical part of the root of a species of convolvulus.——*Turbith mineral*, the yellow precipitate subsulphate of mercury, called *Queen's yellow.*

TUR'BO (*Lat.*), a genus of gasteropodous molluscs, having a regular turbinated shell, with an iridescent interior. The top shells of collectors belong to this genus. They are natives of tropical seas.

TUR'BOT, a large flat fish, the *Rhombus maximus* of ichthyologists, in the family *Pleuronectidæ*. Being a favourite fish for the table, large quantities of turbot are sold in the London market. It grows to the weight of twenty or thirty pounds.

TUR'DUS (a thrush: *Lat.*), in Ornithology, a genus of birds, comprehending the different species of thrush.

TUR'KEY, a name given to gallinaceous birds of the genus *Meleagris*. Our domesticated bird (*M. gallopavo*) is derived from Mexico; but the name Turkey is supposed to have been given to it in the belief that the bird was a native of the country so called. The Honduras turkey (*M. ocellata*) is a much handsomer bird, but is little known in this country.

TUR'MERIC, or INDIAN SAFFRON, the root of the *Curcuma longa*, a plant allied to the Gingers. Externally it is greyish, but internally of a deep bright yellow or saffron colour. Paper stained by it is used as a test in the laboratory; being changed from yellow to brown, by free alkalies, and then carbonates. Turmeric has a slight aromatic smell, and a bitterish taste. It is used for dyeing, and, in some cases, as a medicine; but it is chiefly employed as a seasoning for ragouts and other dishes; and it constitutes a principal ingredient in curry powder. There were 2541 tons of turmeric imported in 1858.

TUR'NERITE, a rare mineral occurring in small crystals of a yellowish brown colour, externally brilliant and translucent. It contains alumina, lime, magnesia, with a small portion of iron and silica.

TURN'ING, in Mechanics, a very ingenious and useful art; in which a great variety of articles are manufactured, by cutting or fashioning them while they revolve upon an axis or line, that generally remains immovable. Every solid substance in nature may be submitted to this process, and accordingly we have articles turned in the metals, in wood, in pottery, in stone, in ivory, &c. The simplest process of turning is that of the potter; who, in the first stage of forming his ware, sticks a piece of soft clay upon a wheel, or flat table, while it revolves horizontally; and in this state of rotation, he fashions it with the greatest facility into vessels of every description. But in most operations of the art the revolving body is cut or shaved by applying a chisel, or other suitable tool, to its surface, while in motion; which requires firmness in the action, or axis of rotation, and also that the tool itself should be steadily supported. The instrument, or apparatus for these purposes, is called a *lathe.* The art of turning is most extensively applicable in all the mechanic arts; for the hardest metals, and the most ponderous articles, as well as the softest wood and the most delicate pivots in a watch, can be fashioned by the turning-lathe.

TUR'NIP, the common name of a cruciferous plant, the *Brossica ropa* of botanists, extensively cultivated for its esculent root. Turnips are a wholesome article of food, much in use. The large rooted varieties have been employed for fodder, during the winter season, from time immemorial. The Swedish turnip has a large root, of a yellowish hue, and is employed for feeding cattle. The plant is the *Brassica campestris*, variety *ruta-baga.*

TURN'PIKES, the name given to the toll gates on the public roads, the ancient gate being a mere pole or pike. The turnpike roads are formed under acts of parliament; and managed by commissioners, trustees, and surveyors. [See ROADS.]

TURN'SOLE, in Botany, a plant of the genus *Heliotropium;* so named because its flower is supposed to turn towards the sun.

TUR'PENTINE (*turpentina: Ital.;* from

terebinthos: Gr.), a transparent resinous substance, procured from different species of the pine and fir. The best sort comes from North America. The method of obtaining it is by making a series of incisions in the bark of the tree, from which the turpentine exudes, and falls down into receptacles prepared to receive it. English turpentine is from the Scotch fir; Venice turpentine, which is more thin and aromatic, is derived from the *pinus larix;* and the common American turpentine comes from the *pinus palustris.* To obtain the *oil of turpentine,* the juice is distilled with water in an apparatus like a common still.

TUR'PENTINE TREE, the *Pistacia lentiscus.* Mastich is obtained from its trunk, by making incisions in it, in the month of August.

TUR'QUOISE, a mineral of a beautiful sky-blue colour; occurring in thin layers, or in rounded masses. It is destitute of lustre, but susceptible of a high polish, and is much used in jewellery; and contrasts well with diamonds and pearls set in gold. It consists chiefly of hydrated alumina; and its colour is probably due to oxides of copper and iron.

TURTLE, the name given to some marine shielded reptiles closely allied to the *tortoise* [which see]. One species, the hawk's bill turtle (*Caretta imbricata*), which lives in the Atlantic and Indian oceans, yields the tortoise shell of commerce. The green turtle (*Chelonia viridis*) found in the tropical parts of the Atlantic, is the animal so much prized by epicures. The head and limbs are but slightly retractile, and the toes are entirely united and enveloped in the common integuments, forming a sort of paddle. Turtles feed on sea-weed at the bottom, but, at a certain season, visit the shore, for the purpose of depositing their eggs in the sand. The instinct which leads the female turtle to the beach to lay her eggs, renders them a prey to man. The fishers wait for them at the beginning of the night, especially when it is moonlight; and, either as they come from the sea, or as they return after laying their eggs, dispatch them by hard blows from a club, or turn them quickly over on their backs, not giving them time either to defend themselves, or to blind their assailants by throwing up the sand with their fins. When very large, it requires the efforts of several men to turn them over, and they must often employ the assistance of handspikes or levers for that purpose. The buckler of this species is so flat, as to render it impossible for the animal to recover the recumbent posture when it is once turned on its back.

TURTLE-DOVE, the *Columba Turtur* of ornithologists, a summer visitor to our islands, where they breed, the parent birds sitting by turns on the eggs. The plaintive *coo* of this bird in the woods is always welcome to the ear.

TUS'CAN ORDER, one of the orders of Architecture; the most ancient, the most massive, and most simple of those invented by the Romans.

TUSSILA'GO (*tussis,* a cough; and *ago,* I act upon · *Lat.*—from its being considered a cure for a cough), in Botany, a genus of composite plants, including the common coltsfoot.

TUS'SIS (*Lat.*), in Medicine, a *cough*, nat. ord *Compositæ.*

TU'TENAG, or *Packfong,* a metallic compound brought from China, called also Chinese copper, or white copper. It consists of copper, zinc, and nickel. Zinc is sometimes called by this name in India.

TUT'TO, or TUT'TI (*Ital.*), in Music, a direction for all to play in full concert.

TUT'TY, the impure oxide of zinc, collected from the chimneys of smelting furnaces.

TWELFHI'NDI, among the Anglo-Saxons, men of the highest rank, who were assessed at 1200 shillings; and, if any injury were done to such persons, satisfaction was to be made according to their worth.

TWELVE TABLES, LAWS OF THE, celebrated laws, framed at Rome by the Decemvirs A.U C 303 They were originally ten, but two more were soon added.

TWI'LIGHT, the faint light diffused through the lower portion of the atmosphere by the reflection of the sun's rays from the higher portion of the atmosphere, after that body has set below, or before it has risen above the horizon. The morning twilight begins, and the evening twilight ends, when the sun is about eighteen degrees below the horizon. At the poles, where there are six months day and six months night, the twilight continues about two months; so that a great part of the half year's night is illuminated.

TYM'PAN (*tumpanon,* a drum: *Gr.*), a part of a printing-press, consisting of a frame covered with parchment; on which the blank sheets are put in order to be laid on the form to be impressed

TYM'PANITIS, or TYM'PANY (same *deriv*), a disease called also *Drum belly;* and consisting in an elastic distension of the abdomen, arising from a morbid collection of gas in the intestines. When caused by air secreted in the abdominal cavity it is generally fatal.

TYM'PANUM (same *deriv.*), in Anatomy, the *drum of the ear;* the membranous partition which separates the auditory passage from the tympanic cavity. This cavity contains the four auditory bones, and it communicates with the open air by means of a narrow canal, called the Eustachian tube.——In Architecture, the triangular space in a pediment enclosed by the cornice of its inclined sides, and the horizontal fillet of the corona; it is often decorated with sculpture.——In Botany, a membrane which sometimes stretches across the mouth of the theca of a moss. It is often styled an epiphragm ——Among the Greeks and Romans, a *tympanum* was a musical instrument, not unlike the tambourine, beaten with the hand.

TYPE (*tupos: Gr.*), in Theology, a sign or symbol; a figure of something to come; as, the paschal lamb was a *type* of Christ. To the word in this sense is opposed *antitype*, Christ, therefore, is the *antitype.*——In Natural History, *Type* is applied to that variety in a species, or species in a genus, or genus in a family, which presents an assemblage of points most characteristic of the species, genus, or family respectively.

TYPE-FOUNDING, the art of manufacturing the metal letters used by printers. The type, or pattern of the letter, is first cut on a steel punch, and then sunk in a matrix of brass or copper, about an inch and a half long, and thick in proportion to the size of the letter it is to contain. The fused type-metal is then poured into the mould, and afterwards loosened from the matrix merely by removing the pressure from the spring A type-foundry is provided with several furnaces, each surmounted with an iron pot containing the type-metal, which usually consists of three parts of lead and one of antimony. The dexterity of the founder is truly surprising; for every movement is executed with such astonishing rapidity and precision, that a skilful workman will cast 500 letters in an hour. The types are then taken by a boy, whose business it is to break off the superfluous metal; and this he does so rapidly as to clear three or four thousand per hour. From his hands the types go to the *rubber*, who sits with a grit-stone slab on a table before him, and having on the fore and middle finger of his right hand a piece of tarred leather, passes each broad side of the type smartly over the stone, so dexterously as to be able to rub 2000 types in an hour The types are now conveyed to a boy, who sets them up in lines in a long shallow frame, with their faces uppermost. This frame, containing a full line, is put into the *dresser's* hands, who polishes them on each side, cuts a groove or channel in the bottom of each, and renders them perfectly symmetrical. Each letter is finally tied up in lines, and a proportionate number of each sort being put together, a *fount of type* is ready for the printing-office.

TY'PHUS (*tuphos*, stupor arising from fever: *Gr.*), in Medicine, a species of continued fever characterized by great debility, a tendency in the fluids to putrefaction, and the ordinary symptoms of fever It chiefly attacks those who have been weakened by any previous debilitating cause, or who are confined in unwholesome and damp situations. It assumes various forms, as low fever, putrid fever, nervous fever, jail fever, &c When nausea and bilious vomiting prevail it constitutes what is termed *bilious fever*. Typhus commences with extraordinary muscular and nervous debility, great depression of spirits, flying pains, sighing, a frequent, small, hard, and fluttering pulse, a foul and brown tongue, impaired taste. As the disease progresses, the debility is increased; the mouth becomes very foul and the breath fetid; the evacuations are extremely offensive and rapidly putrify. The speech then becomes inarticulate muttering, and delirious; there is a tendency to bleeding from the nose, mouth, and bowels; livid spots appear on the surface, hiccup comes on, the hands and feet become cold, and death supervenes. In this climate it may last three weeks or a month: in hot countries eight or ten days. If it does not terminate fatally, the symptoms begin to be favourable about the twelfth or fourteenth day It is contagious, or infectious, and often epidemic.

TYPHOON, the name given to a hurricane, or tornado in the Chinese seas.

TYPOG'RAPHY (*tupos*, a type, and *grapho*, I write: *Gr.*). [See PRINTING.]

TYP'OLITE (*tupos*, an outline; and *lithos*, a stone: *Gr.*), in Natural History, a stone or fossil which has on it impressions or figures of plants and animals.

TY'RANT (*turannos*, literally, a master: *Gr.*), one who exercises arbitrary or excessive power A monarch or other ruler who by injustice or cruel punishment, or the demand of unreasonable services, imposes burdens and hardships on those under his control, which law does not authorize, and which are repugnant to the dictates of humanity ——The word *tyrant*, in its original signification, merely meant an *absolute* ruler; but the frequent abuse of the office led to a different application of the word.

TYRO'SIS (*turos*, cheese: *Gr.*) in Medicine, a disorder in the stomach occasioned by milk coagulating in it.

TYTH'ING (*testha*, the tenth: *Sax*), in Saxon Law, the subdivision of a *Hundred*. It was obliged to produce offenders, or repair the mischief done by them. All free persons above the age of twelve years were bound to belong to some tything. The limits of a tything generally corresponded with those of a parish. It was originally supposed to be a district containing ten freeborn men, of whom each was pledged for the other.

U

U, the twenty-first letter, and the fifth vowel of the alphabet, is generally pronounced nearly like *eu* shortened or blended; as in *annuity*, *enumerate*, *mute*, *infuse*. In some words, as in *bull*, *pull*, *full*, the sound of *u* is that of the Italian *u*, the French *ou*, but shortened. Its other sound is heard in *tun*, *run*, *rub*, &c. Sometimes it is pronounced like a double *o*, as in *rule*, *true*. It is not often used as an abbreviation, but is put for urbis, and thus A U C, anno urbis conditæ (in the year from the building of Rome).

UBIQUITA'RIANS (*ubique*, everywhere: *Lat.*), in Ecclesiastical History, a sect of Lutherans who sprung up in Germany about the year 1540; and maintained that the body of Jesus Christ is (*ubique*) omnipresent, or in every place at the same time, and consequently in the Eucharist.

U'KASE, in Russia, a proclamation, or imperial order published.

UL'CER (*ulcus*: *Lat.*), in Medicine, a purulent solution of continuity, in any of the soft parts of the body, attended with a secretion of pus, or some kind of discharge. Ulcers arise from a variety of causes, and are variously denominated; as *fistulous*, *gangrenous*, *cancerous*, *scrofulous*, *carious*, &c.

ULE'MA, or OULEMA (*Turk.*), a body of learned men, are the administrators of the various powers centred in the person of the Sultan of Turkey, and presided over by the Grand Mufti. It consists of three descriptions of persons; the Imams who are ministers of religion; the Muftis, who are expounders of the law; and the Cadis, who are ministers of justice.

ULMA'CEÆ, in Botany, a nat. order of exogenous trees and shrubs, including, amongst other genera, *Ulmus* (Elm-trees) and *Celtis* (the Nettle trees). The latter bear an edible drupe, sometimes called sugar berry. The flowers of the *ulmaceæ* have no petals, and appear in loose clusters.

UL'MIN (*ulmus*, an elm-tree: *Lat.*), a dark brown substance, which exudes from the bark of the elm, and other trees. It is considered by some as identical with the brown matter of vegetable mould and turf: a substance which greatly contributes to the nutriment of growing plants.

UL'NA (the elbow: *Lat.*), in Anatomy, the larger bone of the fore-arm, reaching from the elbow to the wrist; it is large at its upper extremity, and grows gradually smaller towards the wrist. Its chief use seems to be to support and regulate the motions of the radius.

ULTIMA'TUM (*ultimus*, the last: *Lat.*), in modern diplomacy, the final conditions offered for the settlement of a dispute; or the basis of a treaty between two governments. The word is also used for any final proposition or condition.

UL'TRA (beyond: *Lat.*), a prefix to certain words in modern politics, to denote those members of a party who carry their notions to excess. In 1793, those persons in France were called *ultra-révolutionists*, who demanded much more than the constitution they adopted allowed. When the Bourbons returned to France, in 1815, the words *ultra-royalists* and *ultra-liberals* were much used, and have become common wherever political parties exist.——*Ultra vires* (*Lat.*), a Law phrase applied when a trustee has done something which he was not authorized to do.

ULTRAMARINE (*ultra*, beyond; and *mare*, the sea: *Lat.*), in Painting, a valuable pigment affording a beautiful sky-blue colour.——Its name *ultramarine* is derived from being brought from beyond sea, that is to say, from Hindostan and Persia; and it was originally obtained only from the rare mineral *lapis lazuli*. But excellent ultramarine can now be prepared artificially, with silicate of alumina, silicate of soda, and sulphuret of sodium; its colour being due to the last reacting on the second. Ultramarine was formerly five guineas an ounce; a very good article can now be had wholesale for little more than one shilling a pound. In 1858, 14,562 cwt. of ultramarine, value 77,268*l.* were imported; most probably the greater part of this was artificial.——*Ultramarine ashes*, a pigment which is the residuum of lapis lazuli after the ultramarine has been extracted.

ULTRAMON'TANE (*ultra*, beyond; and *mons*, a mountain: *Lat.*), an epithet applied to countries which lie beyond the mountains: thus France, with regard to Italy, is an ultramontane country.——In Ecclesiastical matters the term is used by writers on this side of the Alps to express doctrines extravagantly favourable to the power and supremacy of the popes, and therefore in accordance with Roman or rather Papal ideas.

UL'VA (*Lat*), in Botany, the *Green Laver*, a plant belonging to the *Algæ*. Three of its species grow in the sea, one in fresh water, and three in damp places on land. The *Ulva thermalis* grows in hot springs at a temperature of 117° Fahr.

UM'BEL (*umbella*, an umbrella: *Lat.*), in Botany, a sort of inflorescence, which consists of a number of flowerstalks or rays spreading from a common centre. It is simple or compound; in the latter, each peduncle bears another series of spreading flowerstalks. Hence *umbellate*, and *umbelliferous*, bearing umbels.

UMBELLIF'ERÆ, in Botany, a large nat. ord. of herbaceous plants (the *Apiaceæ* of some botanists), comprising those which have their flowers in UMBELS. They grow chiefly in the northern parts of the northern hemisphere. The carrot, celery, parsley, parsnip, fennel, coriander, and caraway, belong to this order, which also contains many poisonous plants, such as common hemlock and water hemlock. Others yield matters which are employed in medicine, such as ASSAFŒTIDA, GALBANUM, and OPOPONAX.

UM'BER, in Painting, a pigment affording a fine dark-brown colour. There are two substances used under this name; one, a preparation of the lignite or brown coal, found near Cologne; the other, called *Turkish umber*, an ochraceous iron ore, containing peroxide of iron, peroxide of manganese, silica, alumina, and water. The name is believed to be derived from Umbria, or Spoleto, in Italy, whence it was first brought. It is used in two states; the first, its natural one, with the simple precaution of levigation, or washing; the second, that in which it is found after being burnt. The hues of burnt and unburnt umber greatly differ from each other.——In Ornithology, the *Scopus Umbretta*, a bird belonging to the *Ardeidæ*. It is distinguished from the storks by its compressed bill, whose trenchant column is expanded towards the base; the nostrils are prolonged into a furrow. It inhabits Africa.

UMBILI'CAL (*umbilicus*, the navel: *Lat.*), in Anatomy, an epithet for whatever pertains to the navel; as *umbilical* vessels, *umbilical* region.——In Botany, the *umbilical cord*, or *funiculus*, is the thread which connects the ovule with the placenta. It varies in length in different plants, and is sometimes absent.

UMBIL'ICATE (same *deriv.*), in Conchology, an epithet applied to an univalve shell in which the axis of the column is hollow; such a shell is also styled perforated.——In Botany, an epithet applied to a leaf or other part of a plant which is round, with a depression at the middle.

UM'BO (*Lat.*), the boss or protuberant part of a shield.

UMBO'LDILITE, a Vesuvian mineral, whose primitive form is a right rectangular prism, with a square base. It is of a greenish yellow colour, inclining to brown.

UMB'RIAN, an ancient Italian language spoken to the north of Rome, of which a few fragments of a priestly literature, the tables of Iguvio, have been preserved.

UN, in Philology, a particle giving to words to which it is prefixed a negative signification. *Un* and *in* were formerly used indifferently for this purpose; but the tendency of modern usage is to prefer the use of *in* in some words, where *un* was before used. It is prefixed generally to adjectives and participles, but sometimes also to verbs, as in *unbend*, *unbind*, &c.

U'NA VO'CE (*Lat.*), with one voice; unanimously.

UN'CIAL (*uncia*, the twelfth of a foot: *Lat.*), pertaining to letters of a large size, used in ancient manuscripts.

UN'CIFORM (*uncus*, a hook; and *forma*, a form: *Lat.*), in Anatomy, an epithet for the last bone of the second row of the carpus or wrist; so named from its hook-like process, which projects from the palm of the hand.

UN'CINATE (*uncinatus*, furnished with hooks: *Lat.*), in Botany, hooked at the end.

UNC'TION (*unctio: Lat.*), the anointing with consecrated oil, a practice among the Jews in consecrating kings and priests; also still in use at coronations. One of the seven sacraments of the Roman Catholic church. It is performed in cases of mortal disease, and is called *extreme unction*.

UNDERWRI'TER, one who undersigns a policy of insurance on a ship or its cargo, at a certain rate per cent.

UNDULA'TION (*undulatus*, marked with waves: *Lat.*), a waving motion or vibration; as, the *undulations* of water or air. The undulations of a fluid are propagated in concentric circles.——In Surgery, *undulation* denotes a certain motion of the matter of an abscess when pressed, which indicates its maturity or fitness for opening.

UNDU'LATORY THEORY (same *deriv.*), in Optics, the theory according to which light is transmitted by the undulations of an elastic medium, supposed to pervade the universe. [See LIGHT.]

UN'GUENT (*unguens*, anointing: *Lat.*), in Medicine, a soft composition used as a topical remedy for sores.

UNGUIC'ULATES (*unguis*, a claw: *Lat.*), a primary division of the mammalia, including those which have the digits armed with claws, but free for the exercise of touch on their under surface.——In Botany, an epithet applied to petals which have a broad limb attached by a narrow portion.

UN'GULA (a hoof: *Lat.*), in Geometry, the section of a cylinder, cone, or other solid formed by revolution, cut off by a plane passing obliquely through the base.

UN'GULATES (same *deriv.*), an order of the class mammalia, including those which have the digits inclosed in hoofs, the under surface not being left free for the exercise of touch, such as the ox, the horse, and the elephant.

UNICAP'SULAR (*unus*, one; and *capsula*, a chest: *Lat.*), in Botany, having one capsule to each flower.

U'NICORN (*unicornus;* from *unus*, one; and *cornu*, a horn: *Lat.*), an animal with one horn. According to an examination of the accounts given of the unicorn in ancient and modern times, the opinion of its fabulous character, which has prevailed since the time of Buffon, does not seem to rest on a foundation absolutely certain. Ludovicus Romanus, the traveller, declares that he saw two unicorns alive in the temple of Mecca; some assert that the animal is yet to be found in Thibet, and it is stated by Von Zach that a beast of this description, the male of which has a long and straight horn on the forehead, is found in the district of the ancient Meroe. The animal termed a unicorn, in our version of the Bible, is considered to be the rhinoceros.

UNIFLO'ROUS (*unus*, one; and *flos*, a flower: *Lat.*), in Botany, bearing one flower only.

UNIFORM'ITY, ACT OF (*uniformitas;* from *unus*, one; and *forma*, a form: *Lat.*), the act of parliament by which the form of public prayers, administration of sacraments and other rites, is prescribed to be observed in all the churches. (1 Eliz., and 13 and 14 Car. II.)

UNILA'BIATE (*unus*, one; and *labium*, a lip: *Lat.*), in Botany, having one lip only; as a *unilabiate* corolla.

UNILAT'ERAL (*unus*, one; and *latus*, a side: *Lat.*), in Botany, an epithet for flowers growing only on one side of the common peduncle; as a *unilateral raceme*.

UNILIT'ERAL (*unus*, one; and *literum*, a letter: *Lat.*), consisting only of one letter.

UNILO'CULAR (*unus*, one; and *loculus*, a compartment: *Lat.*), in Botany, seed vessels not separated into cells.——In Conchology, shells not divided into chambers.

U'NION, or ACT OF UNION (*unio*, unity: *Lat.*), in Politics, the act by which Scotland was united to England; or by which the two kingdoms were incorporated into one, in 1706. Also, the legislative union of Great Britain and Ireland, in 1800. The United States of America are also sometimes called the *Union*.——In Architecture, harmony between the colours in the materials of a building.——In Ecclesiastical affairs, the combining or consolidating of two or more churches into one.——Among Painters, a symmetry and agreement between the several parts of a painting.——In Surgery, *union by the first intention* signifies the process by which the opposite surfaces of recent wounds grow together, and unite without suppuration, when they are kept in contact with each other

UNI'SEXUAL (*unus*, one; and *sexus*, sex: *Lat.*), a term applied by botanists to those flowers which have the stamens in one and the pistil in another, instead of having both in the same flower.

U'NISON (*unus*, one; and *sonus*, a sound: *Lat.*), in Music, a coincidence or agreement of sounds; proceeding from an equality in the number of vibrations made in a given time by a sonorous body. Unison consists in sameness of degree, or similarity in respect to gravity or acuteness; and is applicable to any sound, whether of instruments or of the human organs, &c.

U'NIT (*unitas*, oneness: *Lat.*), in Mathematics, any known determinate quantity, by the constant repetition of which, any other quantity of the same kind is measured.

UNITA'RIANS (same *deriv.*), in Ecclesiastical History, a sect who deny the doctrine of the Trinity, and ascribe divinity to God the Father only. *Unitarianism* in England dates almost as far back as the Reformation; and under the names of Arianism and Socinianism, its followers have at times endured much persecution. Unitarians profess to derive their views from Scripture, and to make it the ultimate arbiter in all religious questions; and they assert that, interpreted according to the settled laws of language, the uniform testimony of the sacred writings is, that the Holy Spirit has no personal existence distinct from the Father, and that the Son is also a derived and dependent being.

UNITED BRETHREN. [See MORAVIANS.]

U'NITY (*unitas*: *Lat.*), in Theology, is of two kinds, *unity of faith* and *unity of spirit*. Unity of faith is an equal belief of the same truths of God, and possession of the grace of faith in like form and degree. Unity of spirit is the oneness which subsists between Christ and his saints; by which the same spirit dwells in both; and both have the same disposition and aims.

U'NIVALVE SHELLS (*unus*, one; and *valva*, the leaf of a door: *Lat.*), in Conchology, those of a single piece.

UNIVER'SAL (*universalis*, belonging to the whole: *Lat.*), in Logic, a proposition which has the subject distributed, so that the predicate is declared concerning every thing comprehended in it. It may be either *affirmative* or *negative*. Thus, 'all men are mortal,' or, 'no men are immortal.'

UNIVER'SALISTS (same *deriv.*), a name sometimes given to the *Armenians*, as holding that grace is given to all men, without reserve; and that its operation is universal. On account of holding an opposite opinion, Calvinists are denominated Particularists.

U'NIVERSE (same *deriv.*), the totality of space, and all its material contents and phenomena. Some philosophers suppose it to be filled with an ethereal fluid, in which masses of matter are equally disposed, which masses, like our sun, act as centres of motion, excite luminosity, and transfer motion and momenta to subordinate spheres, like our earth, each centre being millions of millions of miles distant from the others. [See ASTRONOMY, PLANETS, &c.]

UNIVER'SITY (*universitas*: *Lat.*), a name applied to a national establishment for a liberal education, where professors in the several branches of science and polite literature are maintained, and where degrees or honours attached to the attainments of scholars are conferred. Such an establishment is called a *university*, as intended to embrace the *whole* compass of study. The universities of Great Britain are seated at London, Oxford, Cambridge, Durham, St. Andrews, Glasgow, Aberdeen, and Edinburgh. The University of London is of recent foundation, and is composed of University College and King's College. There are two universities in Ireland—that of Dublin or Trinity College, founded by Queen Elizabeth, and the Queen's University, recently established. In their present form, and with their present privileges, they are institutions comparatively modern. They sprang from the convents of regular clergy, or from the chapters of cathedrals in the church of Rome, where young men were educated for holy orders in that dark period when the clergy possessed all the little erudition which was left in Europe. They have long been considered as intended for general purposes; but, as a proof that they had this kind of ecclesiastical origin, it will be sufficient to observe that the pope arrogated to himself the right of vesting them with all their privileges, and that, prior to the Reformation, every university in Europe conferred its degrees in all the faculties by authority derived from a papal bull. The most ancient universities in Europe are those of Oxford, Cambridge, Paris, Salamanca, and Bologna; and in the two English universities the first-founded colleges are those of University, Baliol, and Merton in the former, and St. Peter's in the latter. Oxford and Cambridge, however, were universities, in the original sense of the word, at a very early period, since the former flourished as a seminary of learning in the reign of Alfred the Great, and the latter, if we may credit its historians, at a period still earlier. A university was at first intended merely to supply instruction and confer degrees; the students resided, at their own expense, in halls, &c. Subsequently, colleges were founded by charitable or munificent persons for the entire or partial support of those who were unable to maintain themselves [see COLLEGE]; and finally, when the colleges became the residence also of independent students, the halls were for the most part abandoned. The general arrangements of a British university may be pretty well understood from those of Cambridge. In this university every college is in itself a corporate body, and governed by its own statutes, which must, however, concur with the general laws of the university. Each of the colleges sends deputies both for the executive and legislative branches of the government, and the place of their meeting is termed the senate-house. All the officers of the university, forming the exe cutive part of it, are chosen by the senate, the principal of whom is the chancellor. He is expected to protect and preserve all the rights and privileges of the institution, and to see that strict and impartial justice is administered in every case to the members. The office is entrusted to noblemen of the highest rank. The Vice-chancellor's office is explained by his title; he acts as a magistrate for the university and county, and must be the head of some college. The regents elect two proctors, who are officers of the peace, and superintend the behaviour and discipline of all the pupils. Although there are some particular parts of the duties of these officers which may be considered very unpleasant, yet they must be masters of arts, and are regents by virtue of their office. There are two courts of law in the university of Cambridge, viz. the consistory court of the chancellor, and the consistory court of the commissary. The university sends two members to the imperial parliament of the United Kingdom, who are chosen by the collective body of the senate. A Council, termed the university council, appointed for various purposes, is composed by a *Grace of the senate*, and a solicitor is nominated by the vice-chancellor. The Syndics, chosen from the members of the senate, conduct all special affairs, such as framing laws, regulating fees, and inspecting the library, the printing, buildings, &c. &c. A Degree cannot be conferred without passing a *Grace* for the purpose. All the professors of the sciences are allowed stipends, which are derived from various sources, composed of the university chest, sums from government, or from estates appropriated for that purpose. At the first institution of the university, professorships, or readerships in the different arts and sciences, were established; but these university officers are no longer the main sources of instruction. The several colleges and halls which compose the academical body, have each its own private regulations for the education of its members, but all contribute to the university education. The degrees in Oxford and Cambridge are differently named, or arrived at, in different succession in the different faculties; but degrees in Theology and Medicine can be obtained only after the acquisition of certain degrees in Arts.

UPAS TREE, the *Antiaris toxicaria* of botanists, nat. order *Artocarpaceæ*, a tree rendered famous for its poisonous qualities, which, however, have been very much exaggerated. It was long believed in Europe that there was but a single tree, which was situated in a valley in Java. Its pestilential qualities were said to be so destructive, that neither herb nor animal could live within many miles of its circle, and that none but criminals, few of whom ever lived to return, were sent to gather poison from it. But it is now known to be merely a tree with secretions which contain strychnine, but do not affect the atmosphere around. It is nearly allied to the BREAD FRUIT TREE and the COW TREE. The upas tree has a stem which is cylindrical, perpendicular, and rises completely naked to the height of sixty or seventy, or even eighty feet; near the surface of the ground it spreads obliquely, like many of our forest trees. The bark is whitish, slightly bursting into longitudinal furrows. Near the ground this bark is, in old trees, more than half an inch thick, and, when wounded, yields copiously the milky juice from which the poison is prepared.

UP'LAND, a term for land elevated above the meadows and plains which lie on the banks of rivers, near the sea, or between hills. It is opposed to Meadow, Marsh, Swamp, &c.; and, like Downs, or a gentle hilly country, *uplands* are particularly valuable as affording pasture for sheep.

U'RANITE, in Mineralogy, a phosphate of copper and uranium. It is of a pale gold colour, or yellowish brown; sometimes of an apple-green or emerald hue; and occurs crystallized in rectangular prisms, or in imperfect octahedrons.

URA'NIUM (*ouranos*, the heavens: *Gr.*), a metal discovered in the minerals called pechblende and uranite. It is either a black coherent powder or a white malleable metal, according to the state of aggregation. It is very combustible when exposed to heat, and unites very violently with chlorine and with sulphur.

URANOL'OGY (*ouranos*, the heavens; and *logos*, a discourse: *Gr.*), a discourse or treatise on the heavens; or, in other words, the science of Astronomy.

URA'NUS (*ouranos*, heaven: *Gr.*), the *Georgium Sidus*, or *Herschel*, a planet belonging to our system. Its distance from the sun is 1,800 millions of miles. Its sidereal revolution is performed in about eighty-four Julian years. Its orbit is inclined to the Ecliptic at an angle of only 46′ 28 4. Its diameter is 35,300 miles; its bulk eighty times that of the earth; its density only one-fifth that of our globe. A motion of revolution round its axis has not been made out, but doubtless it exists. Only four satellites have been seen, but possibly there are more. These satellites present the remarkable peculiarities that the planes of their orbits are nearly perpendicular to the ecliptic, and that their orbital motions are retrograde, that is, they move round their primary from east to west.

URARI', OURARI, CURARI, or WOORALY, the Indian names of a virulent poison prepared by the Indians of South America from the wood of the *Strychnos toxifera*; a tree growing in the interior of tropical America. A dart tipped with the poison and blown through a tube of wood, can be made, by the unerring aim of the red man, to take fatal effect on birds and small animals at a distance of fifty or sixty yards. The tree belongs to the same genus as that yielding *nux vomica*, from which strychnine is prepared.

URCE'OLATE (*urceolus*, a little pitcher: *Lat*), in Botany, an epithet for a corolla which is expanded at the middle, but contracted above and below, whilst the limb is small.

UREA (*ouron*, urine: *Gr.*), a crystallizable substance, held in solution in the urine. It consists of carbon, oxygen, and nitrogen

URE'TER (*ourētēr: Gr.*), in Anatomy, the membranous canal which conveys the urine from each kidney to the urinary bladder.

URE'THRA, in Anatomy, a membranous canal or tube which serves as a passage for the discharge of the urine.

U'RIC ACID, in Chemistry, an acid which is always present in human urine and in the excrement of serpents. It constitutes one of the most common forms of urinary calculi, and of the red gravel or sand voided in certain morbid conditions of the urine. Uric acid consists of carbon, oxygen, hydrogen, and nitrogen. Urate of soda is the chief constituent of chalk stones, gouty concretions in the joints, and, when obtained pure, is a snow-white powder.

URIM, a Hebrew word signifying a *luminary*, and hence *fire*. It is connected in its signification with the word *thummim;* both together signify light and perfection. They were precious stones in the high priest's vestments. [See THUMMIM.]

URN (*urna: Lat.*), in Antiquity, a kind of vase of a roundish form, but largest in the middle, destined to receive the ashes of the dead. The substances employed in the construction of these vessels are numerous. Amongst them are gold, bronze, glass, terra cotta, marble, and porphyry. Many urns have been discovered bearing inscriptions; others with the name only of the person whose remains they contained. The Romans derived the form of their urn from the Greeks, who did not, however, use urns as receptacles of the ashes of the dead. It was also customary with the Romans to put the names of those who were to engage at the public games into *urns*, taking them in the order in which they were drawn out. Into such a vessel also they threw the tickets containing their votes at elections. ——The *urna* was also a Roman measure for liquids, containing about three gallons and a half, wine measure. It was half the *amphora*.

UR'SA (*ursus*, the bear: *Lat.*), in Astronomy, the name of two northern constellations; namely, *Ursa Major* and *Ursa Minor*, the Great and Little Bear.

UR'SIDÆ, a family of *feræ*, comprising the bears, racoon, coatimondi, &c.

UR'SULINES, or NUNS OF ST URSULA, a sisterhood founded by Angela of Brescia, in 1537. At first they were not bound to the rules of the monastic life, but devoted themselves merely to the education of children. They were formed into an order by Gregory XIII. in 1577.

URTI'CA MARI'NA (*Sea nettle: Lat.*), an old name for the species of MEDUSÆ, or jelly-fish.

U'SANCE (*Fr.*), in Commerce, the time fixed for the payment of bills of exchange, reckoned either from the day on which the bill is accepted, or from that of its date, varying in different countries, and thus called because wholly dependent on *usage*. The *usance* between London and Paris is one calendar month; hence a bill drawn there on the 2nd of July *at one usance* is, on account of the three days' *grace*, payable in Paris on the 5th of August. A bill is often drawn for a period of *two* or *more usances*.

USE, in Law, originally meant an equitable right to take the rents and profit of land, the ownership of which was vested, through confidence, in another. The system of uses was introduced into this country from the civil law, about the time of Edward III., by the ecclesiastics, who, to avoid the statute of mortmain, caused conveyances to be made, not directly to themselves, but to lay persons as trustees for them. This custom of conveying to trustees soon became very general. It was, however, at once put an end to as far as it regarded religious houses, but has been since regulated, for other purposes, by statute.

USH'ER (*huissier*, a door keeper: *Fr.*), one who has charge of a door.——The *Gentleman Usher of the Black Rod* is an officer of the order of the Garter, who is also an officer of the House of Lords, where he is constantly in attendance. He is chief of the gentlemen ushers who wait in the sovereign's presence chamber. Usher also signifies an assistant to a schoolmaster; where it seems to refer to his office of introducing the scholars to learning.

USTULA'TION (*ustulo*, I scorch: *Lat.*), in Metallurgy, the operation of expelling one substance from another by heat.——In Old Pharmacy, the roasting or torrefying of moist substances over a gentle fire, so as to prepare them for pulverisation.

USUCAP'TION (*usus*, a making use of; and *captio*, a taking: *Lat*), in the Civil Law, the acquisition of the title or right to property by the undisputed possession and enjoyment of it for a certain time prescribed by law

U'SUFRUCT (*usus*, a using; and *fructus*, proceeds: *Lat.*), in the Civil Law, the temporary use or enjoyment of lands or tenements; or the right of receiving the fruits and profits of an inheritance, without diminishing its substance. It is alienable, and therefore differs from *use*, which can be enjoyed only personally.

U'SURY (*usura: Lat.*), a compensation or reward for money lent. In this sense it is merely equivalent to *interest*. In the common business of life, however, it rarely has this signification, but is chiefly used in an odious sense, to express an exorbitant rate of interest. The Jews were not allowed to take interest from one another. The Romans allowed 1 per cent. per month, and punished excessive usury. The amount of legal interest in England was fixed by various statutes, and all contracts made for the payment of a higher interest were absolutely void. But the usury laws have recently been repealed, and now the rate of interest is a free matter of negotiation, except in the case of pawnbrokers. Where interest becomes payable, and no rate has been agreed on, 5 per cent. is the rate allowed by law.

UTILITA'RIANISM (*utilitas*, usefulness: *Lat.*), is the creed which considers utility, or the greatest happiness principle, to be the foundation of morals. 'It holds,' says

Mr. J. S. Mill, who has recently written a little book on the subject, 'that actions are right in proportion as they tend to promote happiness, wrong as they tend to produce the reverse of happiness.'

UTO'PIA, the name of an imaginary island described in the celebrated work of Sir Thomas More (composed in Latin, and published at Louvain, in 1516), in which was found the utmost perfection in laws, politics, and social arrangements. The word is now used to signify a state of ideal perfection.

UTRICULA'RIA (*utriculus*, a *dim.* of *uter*, a bladder: *Lat.*—from the little bladders which often accompany the leaves, and serve to float the plant), in Botany, a genus of plants, nat. ord. *Lentibulariaceæ*. They have been called in English *bladderwort*, having small tuberous roots like the potato.

U'VULA (a *dim.* of *uva: Lat.*), in Anatomy, a soft, round, spongy body suspended from the palate, near the foramina of the nostrils, over the glottis. Its principal use is to break the force of the cold air, and prevent its entering too precipitately into the lungs. When enlarged or relaxed by disease, it is sometimes necessary to amputate a part of it, on account of the obstacle it presents to deglutition, and the tickling cough and retching which it causes.

U'VULA-SPOON, in Surgery, an instrument to be held just under the uvula for the purpose of conveying any substance into the cavity behind.

V

V, the twenty-second letter of the alphabet, is a labial articulation, nearly allied to *f*, being formed by the same organs; but *v* is vocal and *f* is aspirate, and this constitutes the principal difference between them. V has one sound only, as in *vain, very, vote, vanity*. Though *v* and *u* have as distinct uses as any two letters in the alphabet, they were formerly considered as one letter; it was only in the beginning of the sixteenth century that the peculiarity came to be marked. U has since been used as a vowel, and V as a consonant; but in some encyclopædias and dictionaries the absurd practice of arranging together the words which begin with these letters is still continued. As a numeral, V stands for 5; and with a dash over it, for 5000.

VACA'TION (*vacatio*, a being free from duty: *Lat.*), in Law, the period between the end of one term and the beginning of another: and the same in the universities. It also denotes the time when a see or other spiritual dignity is vacant. During the *vacation* of a bishopric the dean and chapter are guardians of the spiritualities.

VACCINA'TION (*vaccinus*, belonging to cows: *Lat.*), in Medicine, inoculation with the cow-pox, intended as a preservative against infection from the small-pox. [See Cow-Pox.]

VACCIN'IUM (*Lat.*), in Botany, a genus of plants, nat. ord. *Vacciniaceæ*. The species are shrubs or trees, as the bilberry, cranberry, &c.

VAC'UUM *Lat.*), in Physics, a space devoid of all matter; and generally conceived by the ancients to exist. The question whether there is such a thing as an absolute *vacuum* in nature or not, has given rise to disputes among philosophers in all ages. The *Torricellian vacuum* is produced by filling a tube, hermetically sealed at one end, with mercury, inverting it into a cup of the same fluid, and allowing it to descend till it is counterbalanced by the pressure of the atmosphere, as in the barometer invented by Torricelli. It is the most perfect vacuum with which we are acquainted. Until recently, modern philosophers believed that the planets moved in an absolute vacuum, but recent observations lead them to doubt that this is the case; for, after the most careful allowance has been made for the attractions of the planets, and the effect of all other known causes of disturbance on Encke's comet, the successive return of that body to its perihelion are accomplished in periods that are constantly diminishing, which is just what would occur if it moved in a medium that offered a small resistance to its motion. It is, however, difficult to reconcile the existence of such a medium with the fact that, during the last 2000 years of observation, no appreciable effect has been produced on the motions of the larger planets. This, however, proves that the resistance, if any, must be feeble, rather than that it does not exist. If there is, in reality, such a medium, a time must inevitably come when all the planets, satellites, and comets will be precipitated into the sun.

VA'DE IN PACE (go in peace: *Lat.*), the words in which sentence of starvation to death, for certain offences, was pronounced in monasteries. The bones of persons who seem to have perished in this way are occasionally found among the ruins of conventual buildings; but Fleury, in his 'Ecclesiastical History,' describes the *vade in pace* as perpetual solitary imprisonment.

VA'DE-MECUM (go with me: *Lat.*), a book or other article which a person constantly carries about with him.

VA'GINATED (*vagina*, a sheath: *Lat.*), in Botany, sheathed; as a stem is sometimes invested by a leaf-stalk.

VAGI'NOPEN'NOUS (*vagina*, a sheath; and *penna*, a wing: *Lat.*), having the wings covered with a hard case or sheath; as *vaginopennous* insects.

VAIR (*varius*, spotted: *Lat.*), in Heraldry, one of the furs employed in blazoning; supposed to represent the skin of a small squirrel.——*Vairy* is the pattern of vair, with more than two colours.——When the bases of figures having this fur in two colours are so ranged as to meet each other, it is called *countervair*.

VALENTINE'S DAY, the 14th of February, a festival in the calendar in honour of St Valentine, who, according to the legend, suffered martyrdom in the reign of the emperor Claudius. There are no circumstances in the life of the saint which seem likely to have given origin to the custom of choosing valentines, or writing to them, as is done about the time of his festival; and it is believed that the practice is one of olden date, substituted for a pagan observance, by which boys and girls drew each other's names on the 15th of February, a day sacred to *Juno Februata*. The reformers attacked the custom, and St. Francis de Sales introduced the drawing of lots for patron saints instead of it.

VALE'RIAN, a plant of the genus *Valeriana*, of which there are many species The root of the *Valeriana officinalis* has an acrid and somewhat bitter taste, and a strong disagreeable odour. It has been long extolled as an efficacious remedy in epilepsy; and is found serviceable in a variety of nervous complaints, but more especially in epileptic and hysterical affections. Cats are exceedingly fond of the smell of its root, so that it is difficult to preserve it in a garden; they seem to be intoxicated by it; and ratcatchers employ its roots to draw the rats together, as they do oil of anise.

VALHAL'LA, or **WALHAL'LA** (the hall of those who died by violence: *Scand.*), the palace of immortality in the Scandinavian mythology, inhabited by the souls of heroes slain in battle. The name is also given to an edifice in the Grecian style, erected by Ludwig I. of Bavaria, near Ratisbon on the Danube, for the purpose of assembling within its walls the busts and statues of all the great men that Germany has produced.

VALO'REM, or **AD VALOREM** (*Lat.*), according to the value; as, an *ad valorem* duty.

VAL'UE (*Fr.;* from *valeo*, I am worth: *Lat.*), in Commerce, the price or worth of any purchasable commodity. The *intrinsic value* denotes the real and effective worth of a thing, and is used chiefly with regard to money, the *nominal* value of which may be raised or lowered at the pleasure of the sovereign; but its real or intrinsic value, depending wholly on its weight and purity, is not at all affected. The value of commodities is regulated principally by the comparative facility of their production, and partly on the relation of the supply and demand. But many other causes operate to raise or depreciate the value of an article; as monopolies, fashion, new inventions, the opening of new markets, or the stoppage of commercial intercourse through war, &c. And, in fact, in all countries where merchants are possessed of large capitals, and where they are left to be guided in the use of them by their own discretion and foresight, the prices of commodities will frequently be very much influenced, not merely by the actual occurrence of changes in the accustomed relation of the supply and demand, but by the mere anticipation of them.——*Value*, in another sense, denotes those properties in a thing which render it useful or estimable, thus, for instance, the *real* value of iron is far greater than that of gold.

VALVE (*valva*, the leaf of a door: *Lat.*), in Anatomy, a membranous partition within the cavity of certain vessels of the body, to afford a passage to fluids in one direction, and prevent their reflux towards the place from whence they came.——In Botany, a capsule or a calyx is said to be valvular when the pieces composing it touch at their edges.——In Hydraulics, Pneumatics, &c., is a kind of lid or cover of a tube or vessel so contrived as to open one way, but which, the more forcibly it is pressed the other way, shuts the closer on the aperture; so that it admits the entrance of a fluid into the tube or vessel, but prevents its return; or admits its escape, but prevents its re-entrance.——*Safety-valve* is a valve in a boiler that opens to allow the escape of steam at a pressure below the strength of the boiler, by which the boiler is prevented from bursting. It is loaded with a weight proportional to the area of its opening, and dependent on the highest pressure which is to be allowed in the boiler. It is sometimes made of a metal, which, if the valve by any accident adheres to its seat [see STEAM-ENGINE], melts and allows the steam to escape, when the pressure, and therefore the temperature, rise beyond a certain point.——*Valves*, in Conchology, the principal pieces of which a shell is composed. They give rise to the distinction into *univalves*, or such as have only one piece; *bivalves*, such as have two pieces; and *multivalves*, such have three or more pieces. [See CONCHOLOGY.]

VAM'PIRE, a blood sucking spectre. A belief in the existence of such beings existed very commonly, in times of superstition, among various nations of Europe. About a century ago, an epidemic dread of Vampires prevailed in Hungary to such an extent as to afford one of the most extraordinary examples of credulity and systematic self-delusion on record.——In Zoology, a species of large bat, the *Vampyrus Spectrum*, a native of South America. It has been asserted that it sucks the blood of animals so as to cause their death; but the truth, says Cuvier, appears to be, that it inflicts only small wounds, which may probably become inflammatory and gangrenous from the influence of the climate. Another South American blood-sucking bat, a species of *Desmodus*, is much dreaded by horses.

VAM'PLET, in Archæology, a piece of steel, formed like a funnel, which was placed on tilting spears just before the hand to secure it, and might be taken off at pleasure.

VANA'DIUM, a metal found in the iron ore of Taberg in Sweden, and in lead ore from Wanlockhead in Scotland. It is white with a metallic lustre, brittle, and difficult to be reduced; is not oxidized by air or water; is not attacked by sulphuric, hydrochloric or hydrofluoric acid; but dissolves in nitric, and nitro-hydrochloric acid, yielding with them solutions of a dark blue colour. Its equivalent is 68·6. The tritoxide of vanadium possesses acid properties and is known as vanadic acid.

VAN'DALS, a ferocious race, who are believed to have come originally from Scandinavia. They seem to have differed only in name from the Goths, whose language they spoke. They settled in the north of Germany, between the Elbe and the Vistula. During the 4th and 5th centuries they became very powerful; and, under Genseric, their king, overran Spain, Gaul, and Italy. They subsequently established themselves in Africa; but were eventually subdued by Belisarius, the celebrated Roman general in the reign of Justinian, who took their king Gelimer, prisoner, and carried him to Constantinople in triumph.

VANE (*vaene: Belg.*), or WEATH'ER-COCK a light body, generally in the form of a thin plate, which is placed on a spindle at the top of a building, and by turning with the wind, points to the part from which it blows.——In ships, a piece of bunting used for the same purpose.

VANIL'LA. This delightful aromatic, so much employed to flavour chocolate and confectionary, is the dried fruit of orchidaceous plants (*Vanilla planifolia*, and other species of the genus), growing in the West Indies, and thence introduced into Java and other hot countries. The fruit is from six to ten inches long, and from a quarter to half an inch broad. It is of a dark brown colour. After being carefully dried (by which operation it is reduced to about one hundredth part of its original weight) it is packed in air-tight metal cases for exportation. In the West Indies the flower is fertilized by means of insects, but elsewhere artificial fertilization must be resorted to.

VA'POUR (*vapor: Lat.*). When liquids and some solids are heated, they are changed into elastic fluids, called *vapours*. Vapours differ from gases or *permanently elastic* fluids, in not retaining their aeriform state at the temperature of the atmosphere. A liquid in the state of vapour is invisible. When cooled, it assumes the liquid state, as mist or fog, and becomes visible. Different substances are changed into vapours, with very different degrees of facility. Fluids are generally more volatile than solids, but there are exceptions; camphor and some other solids evaporate at common temperatures; the fixed oils, sulphuric acid, &c., require a high temperature for evaporation; arsenic and sal ammoniac evaporate without previously assuming the liquid form. Vapours always occupy a greater space than the substances whence they are produced; a cubic inch of water evaporated at an atmospheric pressure of thirty inches of mercury, produces nearly 1700 cubic inches of vapour. Vapours derived from different substances vary in density. Considering the density of atmospheric air as 1000, that of aqueous vapour at the level of the sea, under the ordinary pressure of the atmosphere, will be represented by 625; that of alcohol vapour by 1613; and that of ether by 2586. Hence a vapour such as ether, boiling at a lower temperature than water, would not be an economical substitute for water in the boiler of a steam engine; since a larger quantity must be evaporated to fill the same space of cylinder, and therefore to produce the same amount of motion;—a cubic inch of ether produces only 443 cubic inches of vapour, while a cubic inch of water produces 1696. All pure vapours, for every increase of temperature equal to one degree *Fahr.* increase by the $\frac{1}{480}$th of the bulk they occupy, at 32° *Fahr.* The greater the pressure under which vapour is produced, the higher the temperature required to produce it; and this pressure may be derived, as in the steam boiler, from the pressure of the vapour itself, or the surface of the fluid from which it has risen. At a pressure of only 0·068 inches of mercury, water evaporates at a temperature of 2°; at a pressure of 0·2 inches, it evaporates at a temperature of 32°; at a pressure of 1·98 inches, it evaporates at a temperature of 102°; at a pressure of 30 inches, it evaporates at a temperature of 212°, &c. Equal weights of a given vapour at any temperature contain equal quantities of heat, and are capable of producing the same mechanical effect.

VA'POUR BATH, a contrivance for producing a profuse perspiration by exposing the body to the steam of hot water; the effect being usually increased by friction. The general result of this process is to relax the body, remove obstructions of the skin, alleviate pain and spasmodic contractions, and promote sleep. In the vapour bath, the stimulant power of heat is modified and tempered by the moisture diffused through the air.

VA'RIABLE QUAN'TITIES (*variabilis*, changeable: *Lat.*), in Geometry and Analytics, such as are continually either increasing or diminishing, according to a certain law; in opposition to those which are *constant* and unchangeable.

VARIA'TION (*variatio: Lat.*), in Geography and Navigation, a deviation of the magnetical needle from the true north point; called also *declination*, which are dependent on the earth's motion, and a subordinate electrical action.——In Grammar, change in the termination of nouns and adjectives, constituting what is called case, number, and gender.——*Variation*, in Music, the different manner of playing or singing the same air or tune, by subdividing the notes into several others of less value, or by adding grace, &c.; yet so that the air itself may be discovered through all its embellishments.——*Variation of the moon*, in Astronomy, an inequality in the moon's motion, depending on her angular distance from the sun. It is due to that part of the sun's disturbing force which is at right angles to the radius vectors, and which accelerates the moon, from quadratures to syzygies; but retards it from syzygies to quadratives. It was not observed by the ancient astronomers.

VARICEL'LA (*varicula*, the *dim.* of *varix*, a dilated vein: *Lat.*), in Medicine, the *Chicken-pox*.

VA'RICOSE (*varicosus: Lat.*), in Medicine, an epithet applied to veins of the body that are permanently distended.

VA'RICUS (*Lat.*), in Conchology, ridges on the outside of a shell which indicate the different stages of growth.

VAR'IETY (*varietas: Lat.*), in Natural History, a technical term applied to a race of animals and plants that differ from the type by constant characters. Intermediate links connect the aberrant forms with the normal ones, otherwise the race would take rank as a distinct species.

VARI'OLA (*vario*, I variegate: *Lat.*). [See SMALL-POX.]

VARI'OLITE (*vario*, I variegate: *Lat.*; and *lithos*, a stone: *Gr.*), in Mineralogy, a kind of porphyritic rock, in which the imbedded substances are imperfectly crystallized, or are rounded, giving the stone a spotted appearance. It is an aggregate of felspar and quartz.

VARIO'RUM EDITIONS (*variorum*, of different persons: *Lat.*), in Literature, editions of the Greek and Roman classics, in which the notes of different commentators are inserted.

VA'RIX (*Lat.*), in Medicine, an uneven swelling or dilatation of a vein.

VAR'NISH (*vernis: Fr.*), a fluid which, when spread thinly over a solid surface, forms a coating impervious to air and moisture; and generally gives it a smooth and polished appearance. Varnishes are formed by dissolving substances, which are almost always resinous, in rectified alcohol, or in fixed or volatile oils; thus producing *spirit varnishes*, or *oil varnishes*. The resins most generally used are Turpentine, Copal, Lac, Mastic, Elemi, Sandarach, Amber, Benzoin, Anime, Gamboge, Dragon's blood, Caoutchouc, and Asphaltum.

VARRO'NIAN SATIRE, a species of satire so called from the learned Varro, who first composed it. The style was free and unconfined, containing both prose and verse, intermixed according to the fancy of the writer.

VAS'CULAR (*vasculum*, a small vessel: *Lat.*), pertaining to the vessels of animal or vegetable bodies.——*Vascular System*, in Botany, that portion of the tissue of plants which forms canals serving for the conveyance of fluid and air.

VASE (*vasum: Lat.*), in Architecture, an ornament placed on cornices, socles, or pediments, representing such vessels as the ancients used in sacrifices, &c. The Grecian artists gave to every vase the shape best adapted to its use, and most agreeable to the eye. A great number of these vessels have been preserved to the present day, and offer to artists models of the most beautiful forms. In Etruria and other parts of Italy there have been exhumed many vases which had been in household use. These were distinguished according to their employments by Greek names; thus, vases for holding wine or oil were called *Amphora*, *Pelice*, and *Stamnos*; those for water with three handles, *Hydria* and *Calpis*; those used for mixing wine at a banquet, *Crater*, *Celebe*, and *Oxybaphon*; those for pouring, *Oenochoe*, *Olpe*, *Lecythus*, *Proclius*; those for drinking, *Cantharus*, *Cyathus*, *Cylix*, *Phiala*, *Scyphos*, *Holkion*, *Ceras*, and *Rhyton*; those for unguents, *Alabastra*. Many of these vases are figured in Dennis's Etruria.——Among florists, the calyx of a plant, as the tulip, is called a *vase*.

VA'STUS (large: *Lat.*), in Anatomy, the name of two muscles; namely, the *vastus externus* and *internus*, situated on the outer and inner side of the thigh.

VAT'ICAN, a magnificent palace of modern Rome, built upon the Vatican hill, from which it derives its name. A building on this site was inhabited by Charlemagne in 800. The present pile has been irregularly enlarged, by a long series of popes. It adjoins the church of St. Peter, and is of vast extent, the number of rooms being at least 4,422. It contains a magnificent collection of antiquities, paintings, frescoes, &c., with a noble library, exceedingly rich in manuscripts. The museum of statuary alone is about a mile in length.

VAU'DOIS (*Waldenses: Mod. Lat.*), the inhabitants of certain valleys on the south side of the Alps, from which they derive their name, and who are to be distinguished from those Waldenses who were the followers of Peter Waldo. The Vaudois maintained the purity of their doctrines many ages before the Reformation; and, on account of it, suffered various persecutions; being at one time expelled from their possessions, which, however, they afterwards recovered by force. Their number is, at present, about 30,000.

VAULT (*volta: Ital.*), in Architecture, an arched roof, of which the materials support and sustain each other; it may be circular, elliptical, &c. When its section rises higher than a semicircle, a vault is *surmounted*; when not so high it is *surbased*.

VAV'ASOR, an ancient title of nobility in England; said by Camden to be next below a baron. It was used in France to signify those who held immediately under the higher nobility. In the French romances it meant a poor gentleman.

VEC'TOR (a carrier: *Lat.*), or *radius vector*, in Astronomy, a straight line which is supposed to be drawn from the centre of a planet to the centre of the sun.——In Geometry, a straight line drawn from the focus of a conic section to any point of the curve.

VE'DAS, the sacred writings of the Hindoos, of great antiquity but uncertain date, believed by the Brahmins to have been revealed by Brahma. They are in Sanscrit, and, though forming one work, they are divided into four parts, viz. Rig Veda, Yajur Veda, Sama Veda, and Atharvana Veda. They are regarded as containing the true knowledge of God, of his religion, and his worship. 'Each Veda consists of two parts—the Mantras, consisting of prayers, hymns, and invocations; and the Brahmanas, comprising precepts which inculcate religious duties, maxims explaining these precepts, and theological arguments. They are undoubtedly the most ancient compositions in the whole range of Sanscrit literature. Their obscurity, and the obsolete dialect in which they are written, are such as to render the reading of them difficult even to a Brahmin. The word Vedanta signifies view or object of the Vedas. Under this name there is an ancient work in Sanscrit, said to have been composed 2,000 years ago, and to contain an abstract or quintessence of all the Vedas. The great authority for its doctrine is the collection of sutras or aphorisms.' (Adelung.)

VEDET'TE (*Fr.*), in Military Affairs, a sentinel on horseback, detached from the main body of the army to discover and give notice of the enemy's movements.

VE'GA, a star of the first magnitude in the constellation of the Lyre, the α *Lyræ* of astronomers.

VEG'ETABLE (*vegeto*, I invigorate: *Lat.*) [See BOTANY]. It has been a question much discussed among philosophers in what way plants were originally diffused over the surface of the earth, and three different hypotheses have been invented. Linnæus supposed a single primitive centre of vegetation, whence all species of plants have been gradually dispersed over the globe by winds, rivers, currents, animals, &c. A second hypothesis is, that each species of plants originated in a primitive centre, of which there were several in different parts of the globe, each being the seat of a particular number of species. The third hypothesis is, that, wherever a suitable climate existed, there the vegetable tribes sprang up, and that plants of the same species were, from the first, spread over different regions.——The *vegetable acids* are those acids which are derived from vegetable matters. They are decomposed by a red heat, and nearly all by concentrated hot nitric acid, by which they are converted into carbonic acid and water; but they are less liable to spontaneous decomposition than other substances obtained from plants. The most important are the acetic acid, or vinegar, the oxalic, tartaric, citric, malic, benzoic, and gallic.——*Vegetable alkalies* comprehend those proximate principles of vegetables, which are possessed of alkaline properties. [See ALKALOIDS.]——*Vegetable oils* are divided into fixed and volatile oils, the former of which impart a permanent stain to paper; while the latter, owing to their volatility, produce a stain which disappears by gentle heat. Olive oil and oil of mint are examples of the two.

VE'GETABLE MAR'ROW, the fruit of a plant of the gourd kind, the *Cucurbita ovifera* of botanists, originally growing in Persia, and now cultivated in this and other northern countries. Its flesh is very tender, soft, and of a buttery quality.

VE'HMIC COURTS (*fehm*: *Ger.*), Criminal Courts established in Germany during the middle ages, called also *free courts*; and seemingly derived from those ancient tribunals of the German tribes which were held in the open air. In the 13th century, they became formidable, from being then modelled on a system of secret organization; it is said that 100,000 persons were at one time affiliated to the society. They were bound to attend the secret meetings of the courts when summoned; and to execute their decrees, if necessary, by taking the life of persons condemned. Sometimes these courts had the effect of repressing the lawless violence of the nobility, but they were also liable to be perverted to the gratification of private malice. Various leagues were entered into in the 15th century to put them down, and this was ultimately effected by the introduction of a better system of judicature and police in the various states.

VEIN (*vena*: *Lat.*), in Anatomy, a vessel which receives the blood brought by the arteries, and carries it back to the heart. Veins are continuations of the extreme capillary parts of the arteries, reflected back toward the heart. Uniting their channels, as they approach the heart, all the veins ultimately form three trunks: the *vena cava descendens*, which brings the blood from all the parts above the heart; the *vena cava ascendens*, which brings the blood from all the parts below the heart; and the *vena porta*, or great trunk, which is formed by a union of the veins belonging to the abdominal organs and the organs of digestion, and which, ramifying like an artery in the substance of the liver, transmits its blood by capillaries to the hepatic veins. ——In Botany, the *veins* of plants are an assemblage of tubes, through which the sap is transmitted along the leaves formed of vascular tissue. The term is more properly applied to the finer and more complex ramifications, which interbranch with each other like net work; the larger and more direct assemblages of vessels being called *ribs* and *nerves*.——*Vein*, among miners, a space containing ores, spar, clay, &c.; when it bears ore, it is called a *quick vein*, when no ore, a *dead vein*. Metalliferous veins have been traced in the earth for miles; and many species of stones are also often found in *veins*.

VEL'ITES (*Lat.*), in Antiquity, light armed infantry in the Roman legion, called also *Procubitores*, because employed on outpost duty when the army was before an enemy. They seem not to have been divided into distinct bodies or companies, but to have hovered loosely in front of the army. They were sometimes disposed before the front of the *hastati*; were sometimes dispersed up and down among the void spaces, and sometimes were placed in two bodies in the wings. The *Velites* generally began the combat, skirmishing in flying parties with the first troops of the enemy, and, when repulsed, fell back by the flanks of the army, or rallied again in the rear. Their arms were bows, slings, javelins, a light wooden buckler covered with leather, and a head-piece.

VEL'LUM (*velin*: *Fr.*), a fine kind of parchment made of calves' skin, rendered particularly clear and white. Vellum was used for writing in the time of Eumenes, king of Pergamus. He was anxious to collect a library which should recall that of Alexandria; but, being prevented by the jealousy of the Ptolemies from obtaining a sufficient quantity of papyrus, had recourse to parchment as a substitute. [See PARCHMENT.]

VELO'CIPEDE (*velox*, swift; and *pes*, a foot: *Lat.*), a vehicle consisting of a piece of wood about five feet long, and half a foot wide, resting on two wheels, one behind the other. On this the rider sits, as on horseback, so that his feet touch the ground; while he propels the machine by pressing his feet slightly against the latter, and keeps his balance in the same way. In front of the saddle is a rest for the arms; and the fore wheel may be turned at pleasure, so as to enable the rider to the machine to give any direction he pleases.

VELO'CITY (*velocitas*: *Lat.*), the rapidity with which a body moves, measured by the space traversed in a given time. Velocity is *uniform* when it passes through equal spaces in equal times; otherwise it is *accelerated* or *retarded*. It is *uniformly accelerated* or *retarded*, when the increments or decrements of motion are equal in equal times. Velocity is *absolute* or *relative*; absolute when a body moves over a certain space in a certain time; relative when it has reference to that of another moving body.

VE'NA CA'VA (the hollow vein: *Lat.*). [See VEIN.]

VE'NA POR'TA, or VE'NA PORTA'RUM (the vein of the passages: *Lat.*), produced by the union of the veins of the stomach, intestines, spleen, and pancreas, and ramified in the liver. [See VEIN.]

VENEER'ING, the art of placing a thin piece of a more valuable wood on another which is less expensive in the construction of articles of furniture. Thus mahogany on oak, or deal, or Spanish mahogany on an inferior kind.

VE'NIAL SIN (*venialis*, pardonable: *Lat.*), in Roman Catholic theology, a sin which weakens sanctifying grace, but does not take it away; and which is not necessarily to be mentioned in confession. The reformed churches altogether reject the distinction between mortal and venial sins.

VEN'TIDUCT (*ventus*, the wind; and *ductus*, a conducting: *Lat.*), in Building a passage for wind or air; a subterraneous passage or spiracle for ventilating apartments.

VENTILA'TION (*ventilatio*: *Lat.*), the act of expelling impure air, and of dissipating noxious vapours. Few persons are aware how very necessary a thorough ventilation is to the preservation of health. We can live without food for a considerable time; but keep us without air for a very few minutes, and we cease to exist. It is not, however, enough that we have air; we must have *fresh* air; for the principal by which life is supported is taken from the air during the act of breathing. One-fifth only of the atmosphere is capable of supporting life. By the care we take to shut out the external air from our houses, we prevent the escape of the deteriorated air, and condemn ourselves to breathe, again and again, the same contaminated, unrefreshing atmosphere. Who, that has ever felt the invigorating effects of the morning air, can wonder at the lassitude and disease that follow the continued breathing of the pestiferous atmosphere of crowded or ill-ventilated apartments! It is only necessary to observe the countenances of those who inhabit close rooms and houses, the squalid hue of their skins, their sunken eyes, and their languid movements, to be sensible of the bad effects of shutting out the external air. It is found that an adult spoils four cubic feet of atmospheric air per minute, by respiration; and about three and a half cubic feet, by exhalations from the surface of the body. Hence the air of a close apartment must very soon be seriously vitiated by a number of human beings; particularly if there are also artificial lights, which, by combustion, aid in the mischievous effect produced on the atmosphere. Chemistry has furnished the means of purifying the air of chambers in which persons have been confined with contagious diseases; or in which bad air is generated in other ways, so as to destroy the noxious or offensive power of the effluvia generated in such situations; and thus of preventing its injurious influence. But no fumigation will be of any avail in purifying stagnant air, or air that has been breathed till it has been deprived of its oxygen; such air must be driven out, when its place should be immediately supplied with fresh pure atmosphere. The readiest means of changing the air of an apartment is by lighting a fire in it, and then throwing open the doors and windows; this will set the air in motion, by establishing a current up the chimney.

VEN'TRICLES (*ventriculus*, the *dim.* of *venter*, the belly: *Lat.*), in Anatomy, a word applied to certain small cavities in the body; as, the two cavities of the heart which propel the blood into the arteries to the cavities in different parts of the brain, &c.

VENTRIL'OQUISM (*venter*, the belly; and *loquor*, I speak: *Lat.*), the art of speaking in such a way, that the voice appears to proceed from different places, though the utterer does not change his position, and in many instances does not appear to speak. It has been supposed that sounds were produced by the ventriloquist independently of the labial and lingual organs; but it is certain that practice only is necessary to carry this act of illusion to a high degree of perfection, and that the sound is produced as usual, but with a less opened mouth. The art of the ventriloquist consists merely in this: after drawing a long breath, he breathes it out slowly and gradually, dexterously dividing the air, and diminishing the sound of the voice by the muscles of the larynx and the palate, moving the lips as little as possible; moreover he studies carefully, and thoroughly understands the modifications produced on sound by difference of distance, of position, and other circumstances.

VEN'UE (*vicinia*, neighbourhood: *Lat.*—the place whence the jury are to be taken), in Law, the place where an action is laid, that is, the county in which the cause will be tried. In certain cases the court has power to change the venue.

VENUS (*Lat.*), in Astronomy, a planet of great splendour, known likewise by the names of the *morning* and *evening* star. She is a constant attendant on the sun; and is never seen in the eastern quarter of the heavens when that luminary is in the western quarter. Venus is sixty-eight millions of miles distant from the sun; her sidereal revolution is performed in a little more than 224·7 mean solar days. At the beginning of this century the inclination of her orbit to the ecliptic was 3°, 23′ 28·6″, but it is subject to a slight annual decrease. Her diameter is 7,700 English miles; her volume therefore is 0·927 of that of the earth. Her density is rather more than four-fifths that of the earth. She is supposed to revolve on her axis in about 23h. 21′ 7·2″. Venus has been sometimes observed moving across the sun's disc in the form of a black spot; this is called the transit of Venus. This happened but twice during the last century, viz. in 1761 and 1769, and no other will occur till the year 1874. From the transit of Venus in 1761 was deduced the sun's parallax; and of course his distance from the earth was ascertained with very great accuracy. This being obtained, the distances of the other planets were easily found by observation and calculation.——VENUS, in Malacology, a genus of conchiferous mollusca, of which there are nearly 200 living species. The wampum of the North American Indians consisted of broken shells of *Venus mercenaria* strung on strips of leather, and then used as money.

VENUS DE MED'ICI, a celebrated ancient statue preserved at Florence.

VERAN'DAH, a term of eastern origin applied to a light gallery external to a house, supported on pillars, and often inclosed in front with lattice work. In England verandahs are frequently met in villas and cottage residences, attached to sitting-rooms on the ground-floor, where they afford a good substitute for a colonnade.

VERB (*verbum*, literally, a word: *Lat.*), in Grammar, a part of speech, consisting of an attribute affirmed. Verbs are divided into *transitive*, *intransitive*, and *passive*. A verb substantive expresses mere affirmation, without reference to any property, or attribute.

VER'BAL (*verbalis*, pertaining to verbs: *Lat.*), in Grammar, a word derived from a verb. In English, a verbal is known by the termination *ion*, *ive;* derived from the Latin.

VERBA'TIM ET LITERA'TIM (*Lat.*), word for word, letter for letter.

VERBE'NA, in Botany, a genus of plants, nat. ord. *verbenaceæ*. Their English name is *Vervain*.

VERDE ANTIQUE (*vert antique*, antique green: *Fr.*), in Mineralogy, a mottled aggregate of marble and serpentine. It takes a fine polish, and is used for various ornamental purposes.

VER'DICT (*veredictum*, truly said: *Lat.*), in Law, the answer of a jury given to the court concerning any matter of fact in any case, civil or criminal, committed to their trial and examination. A *special verdict* is one not delivered generally in favour of either plaintiff or defendant, but stating the facts and referring the law arising from them to the judgment of the court, which, in criminal cases, will say whether or not there is a crime in law.

VER'DIGRIS (*vert-de-gris*, the hoary green: *Fr.*), a green pigment, formerly prepared in the south of France by covering copper plates with the refuse of the grapes from which wine had been made. It is manufactured in this country on a large scale by alternating copper plates and woollen cloths previously soaked in pyroligneous acid. It is a mixture of subacetates of copper.

VER'DITER (*verd de terre*, earth green: *Fr.*), a blue pigment, obtained by adding chalk or whiting to a solution of copper in nitric acid. It is a hydrated percarbonate of copper.

VERGET'TE (a small rod: *Fr.*), in Heraldry, a pallet or small pale; hence, a shield divided by such pallets is termed *vergette*.

VER'JUICE (*vergus*: *Fr.*; from *veris jus*, the juice of the productions of spring: *Lat.*), a kind of harsh vinegar made of the expressed juice of the wild apple or crab, which has undergone the vinous fermentation. The French give this name to the sour liquor obtained from unripe grapes.

VER'MES (*Lat.*), in Natural History, the last and lowest class in the Linnæan system. Linnæus comprehends in this class all those living beings which he could not include among the vertebrata or the insecta. The term was limited by Cuvier to what are now known as *annelides* and *entozoa*, and is at present obsolete.

VERMICEL'LI (*Ital.;* from *vermiculus*, a little worm: *Lat.*) A paste made of wheat-flour in the shape of worm-like cylinders of various diameters, the smallest of threadlike being termed *Vermicelli*, and the larger *Macaroni*. It is manufactured by forcing the paste through small apertures in an iron plate, by means of a powerful screw press. It is also cut into ribands and other forms, and is then called Italian paste.

VERMIC'ULAR (*vermiculus*, a little worm: *Lat.*), resembling the tortuous motion of a worm; as the *vermicular* motion of the intestines, called also *peristaltic*.——In Sculpture, *vermicular* or *vermiculated* work; a sort of ornament in Mosaic pavements, winding and representing the tracks of worms.

VER'MIFORM (*vermis*, a worm; and *forma*, a form: *Lat.*), in Anatomy, a term applied to various parts in the human body, bearing some resemblance to worms; as, the *vermiform* process of the cerebellum.

VER'MIFUGE (*vermis*, a worm; and *fugo*, I put to flight: *Lat.*), an anthelmintic medicine; or a substance that destroys or expels worms from animal bodies.

VERMIL'LION (*vermillon*: *Fr.*), a red pigment, of a hue between scarlet and crimson. There are two kinds of vermillion; the one natural or native, and the other common or factitious. *Native vermillion* is found in several quicksilver mines, in the form of a ruddy sand, which only requires to be purified. *Common vermillion* is made of the red sulphuret of mercury; or, as it was formerly called, factitious cinnabar, reduced to a fine powder.

VER'NATION (*verno*, I bloom: *Lat.*), the mode in which the nascent leaves are arranged in a leaf bud.

VER'NIER, an ingenious contrivance, invented by Peter Vernier, for measuring intervals between the divisions of graduated scales, and described by him in 1631. It consists of a small moveble scale, sliding along a graduated scale or arc; and having in a given space a number of divisions greater or less by unity than the number on the same space of the scale or arc. If an inch of the scale or graduated arc is divided into tenths, and ten divisions of the vernier are made equal to an inch and a tenth, each division of the vernier will be equal to one-tenth and one-hundredth of an inch; and any number of divisions of the vernier, equal to a given space to be measured, will be just so many tenths and so many hundredths of an inch; and thus hundredths can be measured by means of a scale divided only into tenths. It would be equally easy to measure thousandths, &c.

VERON'ICA, in Botany, a genus of plants, nat. ord. *Scrophulariaceæ*, containing the speedwell and other wild British plants, as well as some showy garden flowers.

VER'SATILE (*versatilis*; from *verso*, I turn often: *Lat.*), an epithet for that quality which enables persons to turn readily from one thing to another.——In Botany, a *versatile anther*, is one fixed by the middle on the point of the filament, and so poised as to be easily moved.

VERSE (*versus*: *Lat.*), in Poetry, a line, or a part of the composition which contains all the cadences, &c., found in it. The harmony of every verse is complete in itself. Verses are made up of feet, the number and species of which constitute the character of the verse, as *hexameter*, *pentameter*, &c. In the Greek and Roman versification, a foot was determined by its quantity; in the English, quantity is supplied by accent.——*Blank-verse*, poetry in which the lines do not end in rhymes.——*Heroic-verse* that appropriated to epic or heroic poetry; in Greek and Latin, the *hexameter*; in English, &c., the *iambic* of ten syllables, either with or without the additional short syllable; in French, the *iambic* of twelve syllables.——*Versification* is the art of adjusting the syllables, and forming them into harmonious measure. [See POETRY.]

VERST, a Russian measure of length, containing 3,500 feet; about three quarters of an English mile.

VERT (green: *Fr.*), in Heraldry, the colour of green on coats of arms, represented in engravings by lines drawn from the dexter chief to the sinister base.

VER'TEBRÆ (*Lat.*; from *verto*, I turn around: *Lat.*), in Anatomy, the column of bones in the middle line of the bodies of the higher animals, through which the spinal cord passes, and on which the several motions of the trunk are effected. These bones differ considerably in number in the different animals, but in man this column consists of 33 bones, of which 7 called *cervical* are in the neck, 12 called *dorsal* in the back, and 5 called *lumbar* at the loins. Of the remainder 5 are called *sacral* and the lowest 4 *coccygeal*. The cervical vertebræ are smaller than those in the dorsal and lumbar regions; the first one, or that which supports the skull, is called the *atlas*, and the next one is called the *axis*. The dorsal vertebræ decrease in size from the first to the fourth or fifth, and then gradually increase up to the twelfth, which is the largest. To these vertebræ are attached the ribs, which form a bony cage protecting the heart and the great trunks of the vascular system. The lumbar vertebræ are larger than the dorsal. The sacral vertebræ are only separate in the young subject; in the adult they are soldered together, and form but one bone; and the four bones of the coccyx are also soldered together, and constitute the rudiment of a tail, which in many mammalia is largely developed and consists of numerous vertebræ. The vertebræ lock into each other by processes of bone, and between every two there is interposed an elastic cushion of cartilage, which facilitates the motion of the whole. The vertebræ undergo several modifications according to the position; but the elements of a typical vertebræ consist of a bony centrum, around which are disposed four channels formed by *apophyses*, or processes which have received distinctive names; thus those that arise from the posterior part and enclose the spinal cord are called *neurapophyses*. Those arch over and terminate in the neural spine. From each side of the centrum project two transverse processes or *parapophyses*, to which are sometimes attached ribs or *pleurapophyses*; and at the distal extremities of the ribs are the *hæmapophyses*, which are connected with the sternum or breastbone.

VERTEBRA'TA, a subkingdom of animals so named from the possession of a backbone. It is divided into five classes. 1. MAMMALIA, or quadrupeds, of which the females have *mammæ* or teats for suckling their young. 2. AVES, or birds [see ORNITHOLOGY]. 3. REPTILIA, or reptiles. 4. AMPHIBIA. 5. PISCES, or fishes.

VER'TEX (*Lat.*), in Geometry, the top of any line or figure, as the *vertex* of a triangle.——In Anatomy, the crown of the head.——In Astronomy, the zenith, or point of the heavens immediately over the head.

VER'TICAL (from *last*), pertaining to the vertex or zenith. The sun is vertical to the inhabitants within the tropics at certain times every year. A star is said to be vertical when it is in the zenith.——*Vertical anthers*, such as terminate the filaments, and being inserted by their base, stand no less upright than the filaments themselves. *Vertical circle*, in Astronomy, a great circle of the sphere passing through the zenith and nadir, and cutting the horizon at right angles.——*Vertical dial*, a sun-dial drawn on the plane of a vertical circle, or perpendicular to the horizon.——*Vertical leaves*, in Botany, such as stand so erect, that neither of the surfaces can be called the upper or under.——*Vertical line*, in Conics, a right line drawn on the vertical plane, and passing through the vertex of the cone.——*Vertical plane*, in Conics, a plane passing through the vertex of the cone, and parallel to any conic section.——*Vertical plane*, in perspective, a plane perpendicular to the geometrical plane, passing through the eye, and cutting the perspective plane at right angles.——*Vertical point*, that point in the heavens which is over our heads, otherwise called the zenith.

VERTICIL'LATE (*verticillus*, something that turns round: *Lat.*), in Botany, an epithet applied to parts of plants (leaves, flowers, &c.) that are set in whorls, that is circularly round a stem.

VERTI'GO (*Lat*; from *verto*, I turn around), giddiness. It is a common symptom of the fulness of the vessels of the head; and of nervous and general debility. Sometimes it arises from the stomach being overloaded; at others from its being empty. It is a symptom also of various disorders.——In Zoology, a genus of marsh or land snails.

VES'PA (*Lat.*). [See WASP.]

VES'PERS (*vesper*, the evening: *Lat.*), the evening songs or prayers in the Roman Catholic Church.——*Sicilian Vespers*, in French History, a massacre of all the French in Sicily, in the year 1282. It is so called, because the ringing of the bell for vespers was the signal.

VES'TA, in Astronomy, one of the recently discovered ultrazodiacal planets. Its mean distance from the sun is about 224 millions of miles; its sidereal revolution is performed in 1325 7147 mean solar days; its orbit is inclined to the ecliptic at an angle of 7° 8′ 29″; its volume being only about the fifteenth thousandth part of that of the earth, and its surface not larger than the kingdom of Spain. It is the brightest of the smaller planets. [See ASTEROIDS.]

VES'TALS (*vestales*: *Lat.*), in Antiquity, certain virgins consecrated at Rome to the service of the goddess Vesta; and to whom was committed the care of the vestal fire, which was to be kept perpetually burning upon her altar. Their dress was a white vest, with a purple border; a white linen surplice, called *suffibulum linteum*; and over this a large purple mantle, with a long train. On their heads they wore the *infula*, and from the infula hung ribbons. Their period of service was thirty years; during the first ten they were engaged in learning their mysterious duties, during the next ten in performing them, and during the last in teaching them to others. After this was expired they might return to the world, and even enter the marriage state; but few availed themselves of this privilege. They had several privileges; but, when a vestal was convicted of unchastity, she was led to the Campus Sceleratus, and stripped of her habit solemnly by the pontiff. She was then put alive into a pit, with a lighted candle, a little water and milk; and, thus covered up, was left to die.

VES'TIBULE (*vestibulum*: *Lat.*), in Architecture, a porch or entrance into a building.——In Fortification, that space or covered ground which is in front of a guard-house.

VESTIB'ULUM (same *deriv.*), in Anatomy, a round cavity of the internal ear, the opening of which into the cavity of the tympanum is called the *Stapes*; it is connected also with the cochlea and semicircular canals.

VES'TRY (*vestiaire*: *Fr.*; from *vestiarium*, a wardrobe: *Lat.*), a place adjoining the church where the vestments of the minister are kept; also where the parishioners formerly assembled for the discharge of parochial business; whence such a meeting is called a vestry.——*Vestry-clerk*, an officer appointed to attend all vestries, and take account of their proceedings, &c.

VESU'VIAN, in Mineralogy, *Idocrase*, a subspecies of *pyramidical garnet*, a mineral found in the vicinity of Vesuvius and other places. It is generally crystallized in four-sided prisms, the edges of which are truncated, forming prisms of eight, fourteen, or sixteen sides. It is composed of silica, alumina, lime, oxide of iron, and a little oxide of manganese.

VETCH (*vicia*: *Lat.*), leguminous plants, belonging to the genus *vicia*, and extensively cultivated in England under the name of *tares*.

VET'ERINARY ART, or SCIENCE (*veterinarius*, a cattle doctor; from *veterinus*, a beast of burden: *Lat.*), a modern term for what was formerly called farriery. It comprehends a knowledge of the external form as well as the internal structure and economy of the horse; and embraces whatever relates to the diseases to which the horse is liable; with an accurate knowledge of the principles and practice of shoeing, of feeding, exercising, &c. that noble and highly useful animal.

VE'TO (I forbid: *Lat.*), a prohibition, or the right of forbidding, applied to the right of a king or other magistrate or officer to withhold his assent to the enactment of a law, or the passing of a decree.——*Veto* was the important and solemn word which the tribunes or the Roman people made use of when they inhibited any decree of the senate, or law proposed to the people, or any act of other magistrates. The bare pronouncing of the word *veto* was sufficient to suspend the business, without any reasons assigned for their dissent.

VEXIL'LUM (*Lat.*), a flag or standard.——In Botany, the upper petal of a papilionaceous flower.

VI'ADUCT (*via*, a way; *ductus*, a conducting: *Lat.*), any structure, either solid or on arches for the conveyance of a road, and especially of a railway, across a marsh, valley, &c.

VI'A LACTE'A (*Lat.*), in Astronomy, the *Galaxy*, or *Milky way*. [See GALAXY.]

VIAT'ICUM (*Lat.*; from *via*, a journey), among the Romans, an allowance or provision made by the republic for such of its officers or magistrates as travelled upon the business of the state into any of the provinces. The term *viaticum* implies not only money for defraying the expenses of travelling, but their clothes, ornaments, baggage, &c.——*Viaticum*, in the church of Rome, an appellation given to the eucharist, when administered to persons at the point of death.

VIA'TOR (*Lat.*), in Roman Antiquity, an appellation given in common to all officers of any of the magistrates; as lictors, accensi, scribes, criers, &c.

VIBRA'TION (*vibratio*, from *vibro*, I set in tremulous motion: *Lat.*), the regular back and forward motion of a body, such as a pendulum; which being freely suspended swings or vibrates from side to side. The vibrations of the same pendulum are all made in equal times, at least in the same latitude. The word *oscillation* is now generally applied to the slow alternate motion of a pendulous body: the term *vibration* being reserved to express quicker motions, such as those of a sonorous body.——*Vibration*, in Music, the motion of a chord, or the undulation of any body, by which sound is produced. The acuteness and gravity of sound depend on the tension, length, thickness, and density; the number of vibrations in a given time, being directly as the square root of the tension of the cord; inversely, as its length, thickness, or diameter; and inversely as the square root of its density. In rods of the same material the number of vibrations in a given time varies directly as the thickness, and inversely as the square of the length of the vibrating part. If thin elastic plates are set in vibration; for example, by drawing the bow of a violin across their edges, after a small quantity of very fine sand has been strewed over them, the sand will form various figures, and will indicate certain lines of repose, at which there is no motion whatever; rods and strings also break themselves up into distinct vibrating portions separated by points of rest, which may be found experimentally by placing small pieces of paper across the rod or string.

VIC'AR (*vicarius*, a substitute; *Lat.*), the priest of a parish in which the predial or greater tithes are impropriated or appropriated, that is, belong to a chapter or religious house, or to a layman, who receives them.— *Vicar-general*, the bishop's assistant in the general government of his diocese. This title was given by Henry VIII. to the earl of Essex, with power to oversee all the clergy, and regulate all ecclesiastical affairs. In the Church of England, it is the title of an office, which, as well as that of official principal, is united in the chancellor of the diocese. The business of the vicar-general is to exercise jurisdiction over matters purely spiritual.——*Vicars apostolical*, in the Roman Catholic church, those who perform the functions of the pope in churches or provinces committed to their direction, and the functions of bishops in countries where there are not regular dioceses; they are usually of the episcopal order.

VICE (in place of: *Lat.*), a word used in composition, to denote one *qui vicem gerit*, who acts in the place of another, or is second in authority. Thus we say, the *vice-chamberlain*, *vice-chancellor*, *vice-president*, *vice-gerent*, *viceroy*, &c.——*Vice*, in the constructive arts, an instrument used for holding fast any piece of iron, &c., upon which the artificer is working.——Among glaziers, a machine for drawing lead into flat rods for case windows.

VI ET AR'MIS (by force, and arms: *Lat.*), in Law, words made use of in indictments and actions of trespass, to show the violent commission of any trespass or crime.

VIG'IL, in Church affairs, the evening before any feast. The word is derived from the *vigiliæ*, which denoted the night watches among the Roman soldiers; and it was adopted by the first Christians who spent a part of the night preceding the solemn festivals in prayer, to prepare themselves for the coming celebration.

VIL'LEIN (*vilain: Fr.*), a name given, in ancient times, to persons not proprietors of land; many of whom were attached to the soil, and bound to serve the lord of the manor. [See **FEUDAL SYSTEM**].

VIL'LOSE (*villosus*, hairy: *Lat.*), in Natural History, a term applied to anything covered with soft, flexible hairs thickly set.

VIL'LOUS (same *deriv.*), in Anatomy, a term applied to surfaces, such as those of the small intestines which are covered with *villi*, minute folds of the mucous membrane. When injected, villi form interesting microscopic objects, as a network of capillaries are seen.

VINE (*vimea*, a vineyard: *Lat.*), the name of plants belonging to the genus *Vitis*. They are cultivated in most warm and temperate countries; and of which there are an immense number of varieties. In wine countries the vineyards cover large tracts, and the manufacture of wine is an important branch of industry.——In Italy and other southern regions the vines hang from trees, &c. in rich and beautiful festoons. In places more to the north, they are trained to the form of gooseberry bushes. The vine was formerly grown in England, for the manufacture of wine, without any protection, particularly in the more southern counties, having been introduced by the Romans; and we find from the Domesday Book, that abbeys and convents had their vineyards. The inmates of these institutions were many of them foreigners, and they contributed to render the cultivation of the vine tolerably successful. The names of several places in Kent are supposed to be derived from their having been the site of vineyards. In the reign of Henry II., the cultivation of the vine in England began to be neglected. Our intimate connection with France—our actual possession, indeed, of a portion of the wine-growing districts of that country,—contributed to produce this circumstance. But though the making of wine was no longer carried on in so extensive a manner, yet there is sufficient testimony that during the 16th and 17th centuries a considerable quantity of wine was made in England from the produce of the grape. [See **GRAPE**.] That wine has most flavour in which both the skins and stones are bruised and fermented. As a general rule, the varieties of the vine most esteemed for the production of wine have small berries and bunches, with an austere taste. In certain localities, the vine lives only twenty or thirty years; but under favourable circumstances it may last a hundred.——The word *vine* also denotes the long slender stem of any plant that trails on the ground, or climbs and supports itself by winding round a fixed object, or by seizing it with its tendrils or claspers.

VIN'EGAR (*vinaigre*, literally, sour wine: *Fr.*), an impure form of acetic acid obtained from wine, cider, beer, or other liquors, by the acetous fermentation; also from wood, by destructive distillation. The varieties of acetic acids known in commerce are five: 1. wine vinegar; 2. malt vinegar; 3. cider vinegar; 4. sugar vinegar; 5. wood vinegar. In Great Britain vinegar is usually manufactured from malt; though a very considerable quantity, made for family use, is made from cider and British wines. [See FERMENTATION.]

VI'NERY, in Gardening, an erection for supporting vines and exposing them to artificial heat.

VINIFACTEUR (*Fr.*; from *vin*, wine; *facteur*, a factor), an apparatus made use of in France and Spain to improve the spirituous fermentation of wine. During the fermentation, a portion of the etherial parts of the wine escapes from the open vats; and the *vinifacteur* is intended to collect these, and to convey them back to the *must*.

VI'NOUS FERMENTA'TION. [See FERMENTATION.]

VI'OL (*violle: Fr.*), a stringed musical instrument, of the same form as the violin, but larger. Viols are of different kinds; the largest is called the *bass viol*, whose tones are deep, soft, and agreeable.

VIO'LA (*Lat.*), VIOLET, a genus of polypetalous exogens containing numerous species, including those well-known plants, the sweet violet, the dog violet, and the tricolor violet. All the varieties of pansy or heartsease have been produced by cultivation from some of the wild species. The corolla is composed of five unequal petals, of which the inferior is the largest, and is more or less prolonged into a spur at the base. The roots are generally perennial, and, in some species, possess an emetic property, which renders them a useful substitute for ipecacuanha.

VIOLI'NO (*Ital.*; the *violin*), the most perfect of all stringed musical instruments played with the bow. It consists of three chief parts—the neck, the table, and the sound-board. The violin has four catgut strings of different sizes, of which the largest is wound round with wire. The bridge bears them up from the belly, and they reach from one extremity called the tail piece, to the other near the hand, where they are tightened by turning pins. The excellence of the instrument consists in its purity and distinctness, strength, and fulness of tone.

VIOLONCEL'LO (*Ital.*), a musical instrument which comes between the *viola di braccio* (or arm viol) and the double bass, both as to size and tone. It is constructed entirely on the same plan with the violin; but the player holds it between his knees. It generally accompanies the double bass.

VIOLO'NE (*Ital.*), the English *double bass*, a deep-toned musical instrument, the largest of the kind played with a bow, and principally used to sustain the harmony Its strings, which are seldom more than three in number, are an octave below the violoncello.

VI'PER (*vipera*; contracted from *vivipera*, bringing forth alive: *Lat.*), an animal of the snake tribe, the bite of which is more or less venomous in all countries; but in tropical regions it is almost instantly fatal. Under this name are included those serpents which have a broader head than neck, and no pits behind the nostrils. Like many other poisonous groups of serpents, the vipers are ovo-viviparous. The true vipers have the head covered with scales, like those on the back, and very large nostrils. The black and common adders, which belong to this family, are the only indigenous venomous reptiles of Great Britain.

VIR'GINAL, a stringed and keyed instrument resembling the spinnet. It is now quite obsolete, though formerly in great repute.

VIR'GO (the virgin: *Lat.*), in Astronomy, the sixth sign of the zodiac. Being usually represented as a figure with an ear of corn in her hands, it is also called *signum cereris* (the sign of Ceres). The constellation Virgo contains a star of the first magnitude called *spica virginis*.

VIR'TU (*Ital.*), a taste for curiosities connected with the fine arts.

VIR'TUAL FOCUS (*virtus*, efficacy: *Lat.*), the point from which rays, after having been rendered divergent by reflection or refraction, seem to issue.

VIR'TUAL VELOC'ITY (same *deriv.*), in Mechanics, the velocity which any particle of a body in equilibrium would actually acquire during the first instant of its motion, if the equilibrium were from any cause disturbed. Particles which are at different distances from the centre round which a body would revolve, have different virtual velocities proportional to the distance of such particles from that centre.

VIRTUO'SO (*Ital.*), one skilled in antique or natural curiosities; a lover of the liberal arts. The word is now seldom employed.

VI'RUS (*Lat.*), in Medicine, a watery fœtid matter which issues from wounds, and is endued with corrosive and malignant qualities.

VIS (*Lat.*), a word used by the olden writers on physics, to express force. Thus *vis acceleratrix*, accelerating force; *vis inertiæ*, the resistance which a body offers to a change from either motion or rest—so that, when in motion, it will not stop of itself; nor, when at rest, move of itself. Bodies on the surface of the earth *seem* to stop *of themselves*; but their motion is gradually destroyed by friction, and the resistance of the air.——*Vis insita*, that power by which a muscle, when wounded, touched, or irritated, contracts, independently of the will.——*Vis medicatrix naturæ*, a term employed by physicians to express that healing power in an animated body, by which, when diseased, the body is enabled to regain its healthy actions.——*Vis mortua*, that property by which a muscle, after the death of the animal, or a muscle, immediately after having been cut from a living body, contracts.——*Vis nervosa*, a power of the muscles by which they act when excited by the nerves.——*Vis plastica*, that facility of formation which spontaneously operates in animals.——*Vis vitæ*, the natural power of the animal machine in preserving life. The term *Vis* has been often erroneously given to vital operations the result of organization.

VIS'CERA (*Lat.*), the plural of *viscus*, which see.

VI'SCOUNT (*vice comes*, the deputy of a count; *Lat.*), a nobleman next in degree to an earl. The first viscount was created by Henry VI. in 1440.——A *viscount's coronet* has neither leaves nor points raised above the circle, like those of superior degree, but only pearls placed on the circle itself. It is like that of a baron; but has sixteen pearls in place of six.

VIS'CUS (*Lat.*), in medical science, an internal part which has an appropriate use; as the viscera of the abdomen, &c.

VISH'NU, one of the three chief divinities of the Hindoo mythology. He is usually placed second, and his chief attribute is that of preservation. The sects into which his worshippers are divided are very numerous. It is believed that he has appeared on earth nine times, his incarnations being called *avatars*. The tenth has yet to come. His names are innumerable, one of the best known is Krishna, by which he was styled in one of his descents to the earth. Vishnu and Siva are each thought by many of their worshippers to be superior to every other deity, even Brahma. A worshipper of Krishna has put into his mouth the following words—'I am the father of this world: I bear in my hand immortality and death: I am what is and is not: I am the beginning, the middle, and the end of all things: I am Vishnu among the gods, the sun among the stars: I am the essence of all things, and nothing animate or inanimate can exist without me.'

VIS'ION (*visio; Lat.*), in Physiology, the act of perceiving objects by means of the organ of sight. Modern philosophers agree in supposing vision to be produced by rays of light, reflected from the several points of objects, received in at the pupil, refracted and collected in their passage through the coats and humours to the retina, and forming *there* a picture, like that in the *camera obscura*—which very much resembles the eye in principle. The impression thus made is transmitted to the optic nerve, and thence to the brain. [See EYE, OPTICS, &c.]

VISITA'TION (*visitatio: Lat.*), in Ecclesiastical Law, the inspections by a bishop of the different parishes in his diocese, or by an archbishop of the dioceses in his province. Visitations were formerly required to be annual; at present it is the custom at Easter and Michaelmas to summon the clergy to some convenient place. Those for the purpose of confirmation, must be held at least once in three years. Archdeacons have now the care of the parochial institutions, and the duty of examining into whatever relates to churches, parsonages, and parochial visitation by the archdeacons is annual.

VIS'UAL (*visus*, a seeing: *Lat.*), belonging to sight.——*Visual angle*, in optics, that angle under which an object is seen: or that formed at the eye, by rays of light coming from the extremities of the object, and interesting each other, at the centre of the crystalline lens.——*Visual point*, in Perspective, a point in the horizontal line, where it is intersected by the vertical line. [See PERSPECTIVE].——*Visual rays*, lines of light supposed to come from the object to the eye.

VI'TAL FUNC'TIONS (*vitalis*, pertaining to life: *Lat.*), those functions or faculties of the body on which life immediately depends; as the circulation of the blood, respiration, &c.

VI'TIS (*Lat.*), in Botany, a genus of plants, nat. ord. *vitaceæ*. The principal species are the *Vitis vinifera*, the common vine, and the *Vitis Indica*, the Indian vine [See VINE].

VIT'REO-ELEC'TRIC (*vitreus*, pertaining to glass: *Lat.*), in a state of positive electricity, such as is exhibited by rubbing glass.

VIT'REOUS HU'MOUR (same *deriv.*), the pellucid substance which fills the whole bulb of the eye behind the crystalline lens.

VITRIFAC'TION (*vitrum*, glass; and *facio*, I make: *Lat.*), the act, process, or operation of converting into glass by heat; as, the *vitrifaction* of sand, flint, and pebbles, with alkaline salts.

VIT'RIOL (*vitrum*, glass: *Lat.*), from the appearance of its crystals, a term applied by the older chemists to crystallized *sulphate* of *iron* or green vitriol. *Sulphate* of *copper* or blue vitriol, and *sulphate* of *zinc* or white vitriol, obtained these names afterwards. *Oil of Vitriol* is the vulgar name of SULPHURIC ACID.

VITRIOL'IC ACID. [See SULPHURIC ACID.]

VIVA'CE, in Music, an Italian word signifying lively; and *vivacissimo*, very lively.

VI'VARY (*vivarium*; from *vivus*, alive: *Lat.*), a place for keeping living animals, as a park, a warren, a pond, &c.

VI'VA VO'CE (*Lat.*), by word of mouth: as, to vote, or to communicate with another person, *vivâ voce*.

VIVES, in the Veterinary art, a disease of horses and some other animals, seated in the glands, under the ears, where a tumour is formed, which sometimes ends in suppuration.

VIVIP'AROUS (*vivus*, alive; and *pario*, I bring forth: *Lat.*), in Natural History, producing young in a living state; as distinguished from *oviparous*, producing eggs. In its restricted sense, viviparous is applied to that mode of generation, in which the chorion or external tunic of the ovum acquires a vascular adhesion with the uterus: hence only the *placental* mammalia are really viviparous, the rest being *ovo-viviparous*.——In Botany, a *viviparous plant* is one in which either the seeds germinate on the plant, instead of falling, as they usually do, or which produces its living offspring on the leaves or branches.

VIZ'IER, or **GRAND VIZIER** (a porter: *Arab.* applied by a singular metaphor to a high officer of state), the title of the chief minister of the Turkish empire. He is the representative of the sultan, conducts the deliberations of the divan, and decides alone; for by a seal which he receives at the time of his appointment, he is authorized to rule with absolute power, in the name of the sultan. The title of *vizier* is also given to all the pachas of three tails, or pachas of the highest rank.

VO'CAL MU'SIC (*vocalis*, pertaining to the voice: *Lat.*), music produced by the voice, either unaccompanied or accompanied by instruments. Vocal music has many advantages over instrumental, in its endless variety of intonation and expression, and in the support which it derives from its connection with words. [See MUSIC.

VOICE (*voix: Fr.;* from *vox: Lat.*), the sounds produced by the air emitted from the organs of respiration, especially the larynx. The lungs, the wind-pipe, &c., the finely-arched roof of the mouth, and the pliability of the lips, are each of the greatest importance in producing the different intonations which render the human voice so agreeable and harmonious. A good musical voice depends chiefly upon the soundness and power of the organs of utterance and of hearing; and is much promoted by the practice of singing and gymnastic exercises that expand the chest.

VO'LANT (*Fr.*), in Heraldry, an epithet for flying or having the wings spread.

VOL'ATILE (*volatilis*, flying: *Lat.*), in Chemistry, an epithet for substances which evaporate, or gradually pass off, of themselves in the aeriform state: as musk, ammonia, and the various essential oils. Alcohol and ether are called *volatile* liquids for a similar reason, and because they easily pass into the state of vapour on the application of heat.

VOLCA'NO (*Ital.;* from *vulcan*, the God of fire), in Geology, a burning mountain, from which issues from time to time melted matter at a high temperature, ashes, smoke, sulphurous exhalations, &c. When the volcano has long ceased to act, it is said to be *extinct*. Beneath the outer crust of the earth inflammable materials appear to exist, which access of water excites into combustion. It may not unreasonably be supposed that there are within the earth vast masses of potassium, sodium, &c., which on contact with that fluid immediately become converted into matter in a state of intense ignition. There are even chemical substances known, which by mere contact with each other produce the same effect. No doubt hydrogen, which should be evolved in these circumstances, is not a usual accompaniment of volcanic actions; and it is hard also, to conceive that under the influence of such causes, volcanos could continue in activity for the long periods during which some are known to produce these effects. But these difficulties arise, perhaps only from our limited knowledge. Volcanos break forth under the sea, as well as the dry land, and throw up mountains which rise above the level of the water, causing tremblings of the coasts. Their action often extends through five or six hundred miles; and they frequently produce effects which are most frightful and destructive. The subterranean thunder heard at great distances under Vesuvius, prior to an irruption, indicates that there are mighty caverns beneath the earth; and the existence of a subterranean communication between the Solfatara and Vesuvius, is established by the fact that whenever the latter is in an active state, the former is comparatively tranquil. It affords some ground for the conjecture that water is, in some way, an agent in causing volcanic action, that almost all volcanoes of considerable magnitude in the old world are in the vicinity of the sea; and in those where the sea is more distant, as in the volcanoes of South America, the water may be supplied from great subterranean lakes; for Humboldt states that some of them throw up quantities of fish. But the hypothesis of the nucleus of the globe being composed of matter liquified by heat, offers a still more simple and general solution of the phenomena of volcanic fires. Observations made in all countries, in mines and caves, prove that, even at a small depth, the earth's heat is much superior to the temperature of the surrounding atmosphere. A fact so remarkable, and elicited from observations made in almost every part of the globe, connects itself with what we learn of the phenomena of volcanoes. The sinking of mines, Artesian wells, &c., has even furnished us with data, by which we may calculate the rate at which the temperature increases as we descend into the earth. It has been supposed that a crust of only about 200 miles in thickness covers a globular mass of matter, which is in a state of intense ignition, sufficient to fuse with ease the most refractory substances with which we are acquainted. If such be the case, it is easy to conceive that the elastic vapours, which are generated, force to the surface from below the melted matter, and cause it to issue from openings already in existence, or from new ones—if the others are not sufficiently large or near. There are certain regions to which volcanic eruptions, and the movements of great earthquakes, are almost confined; over the whole of vast tracts active volcanic vents are distributed at intervals, and are most commonly arranged in a liniar direction. Throughout the intermediate spaces there is abundant evidence that the subterranean fire is continually at work; for the ground is convulsed, from time to time, by earthquakes; gaseous vapours, especially carbonic acid gas, are disengaged plentifully from the soil; springs often issue at a very high temperature, and their waters are very commonly impregnated with the same mineral matters, which are discharged by volcanoes during eruptions. Of these great regions, that of the Andes is one of the best defined. Commencing southward, at least at Chili, at the forty-sixth degree of south latitude, it proceeds northward, to the twenty-seventh degree, forming an uninterrupted line of volcanoes. The Chilian volcanoes uprise through granitic mountains. Villarica, one of the principal, continues burning without intermission, and is so high that it may be distinguished at the distance of 150 miles. A year never passes in this province without some slight shock; and about once in a century, or oftener, tremendous earthquakes occur, by which the land has been shaken from one extremity to the other, and continuous tracts, together with the bed of the Pacific, have been raised permanently from one to twenty feet above their former level. Hot springs are numerous in this district, and mineral waters of various kinds. Pursuing our course northward, we find in Peru only one active volcano as yet known; but the province is so subject to earthquakes, that scarcely a week passes without a shock; and many of these have been so violent as to create great changes in the surface. Farther north, we find, in the middle of Quito, where the Andes attain their greatest elevation, Tunguragua, Cotopaxi, Antisana, and Pichincha, the three former of which not unfrequently emit flames. From the first of these, a deluge of mud descended in 1797, and filled valleys, 1000 feet wide, to the depth of 100 feet, forming barriers, by which rivers were dammed up, and lakes produced. In the year 1812, violent earthquakes convulsed the valley of the Mississippi at New Madrid, for a space of three hundred miles in length. As this happened exactly at the same time as the great earthquake of Caraccas, it is probable that these two points are parts of one continuous volcanic region: for the whole circumference of the intervening Caribbean sea must be considered as a theatre of earthquakes and volcanoes. On the north lies the island of Jamaica, which, with a tract of the contiguous sea, has often experienced tremendous shocks, and these frequently extend from Jamaica to St. Domingo and Porto Rico. On the south of the same basin, the shores and mountains of Columbia are perpetually convulsed. On the west is the volcanic chain of Guatimala and Mexico, and on the east, the West Indian isles, where in St. Vincent's and Guadaloupe, are active vents. Thus it will be seen that volcanoes and earthquakes occur, uninterruptedly, from Chili to the north of Mexico; and it seems probable, that they will hereafter be found to extend, at least, from Cape Horn to California. In another direction, the volcanic range is prolonged through Borneo, Celebes, Banda, New Guinea, and various parts of the Polynesian archipelago. The Pacific ocean, indeed, seems, in equatorial latitudes, to be one vast theatre of igneous action, and its innumerable archipelagoes, such as the New Hebrides, Friendly islands, and Georgian islands, are all composed either of coralline limestones or volcanic rocks, with active veins here and there interspersed. In the old world, the volcanic region extends from east to west for the distance of about 1000 miles, from the Caspian sea to the Azores, including within its limits the greater part of the Mediterranean and its most prominent peninsulas. From south to north, it reaches from about the thirty-fifth to the forty-fifth degree of latitude. Its northern boundaries are Caucasus, the Black sea, the mountains of Thrace, Transylvania, and Hungary,—the Austrian, Tyrolean, and Swiss Alps,—the Cevennes and Pyrenees, and the mountains which branch off from the Pyrenees westward, to the north side of the Tagus. Respecting the volcanic system of Southern Europe, it may be observed, that there is a central half, where the greatest earthquakes prevail, in which rocks are shattered and cities laid in ruins. On each side of this line of greatest commotion, there are parallel lands of country where the shocks are less violent. At a still greater distance, as in Northern Italy, there are spaces where the shocks are much rarer and more feeble. Beyond these limits, again, all countries are liable to slight tremors at distant intervals of time, when some great crisis of subterranean movement agitates an adjoining volcanic region; but these may be considered as mere vibrations, propagated mechanically through the external crust of the globe, as sounds travel almost to indefinite distances through the air. During the last century, about fifty eruptions are recorded of the five European volcanoes, Vesuvius, Ætna, Volcano, Santorin, and Iceland; but many beneath the sea, in the Grecian archipelago, and near Iceland, may have passed unnoticed. If some of them produced no lava, others poured out torrents of melted matter for months together; so that, however inconsiderable may be the superficial rocks, which the operations of fire produce on the surface, when it is computed that on the whole globe 2000 volcanic eruptions occur in the course of a century, we must suppose the subterranean changes now constantly in progress to be on the grandest scale. [See EARTHQUAKE.]

VOL'TA, in Music, an Italian word, signifying that the part is to be repeated, one, two, or more times. Thus *Si replica una volta*, means that the piece is to be performed *over again*.

VOLTA'IC ENGRA'VING. [See ELECTROTYPE, and ENGRAVING.]

VOL'TAISM, or VOLTAIC ELECTRICITY (from *Volta*, who made some of the earliest discoveries regarding it), the phenomena arising from the development of electricity, by means of chemical action and the use of the *voltaic* battery. [See GALVANISM.]

VOLTAM'ETER, an instrument for measuring the intensity, &c., of an electric current.

VOL'UME (*volumen*, from *volvo*, I roll: *Lat.*), a roll or book; so called because the ancient books were rolls of bark or parchment. This manner of arranging books lasted till Cicero's time. The several sheets or pieces were glued or pasted end to end, and written only on one side. At the bottom a stick was fastened, called *umbilicus*, round which it was rolled; and at the other end was a piece of parchment, on which the title of the book was written, often in letters of gold.

VOL'UNTARY (*voluntarius*, of one's own free will: *Lat.*), in Music, a piece played by a musician extemporarily, according to his fancy.

VOL'UNTEER (*volontaire*; from *same*), a person who enters into military or other service of his own accord.

VOLU'TA (*voluto*, I twist: *Lat.*), in Natural History, a genus of testaceous gasteropodous molluscs, chiefly found in the tropical seas. Their shells are often of great beauty, and sometimes of great size. To this genus belong the admiral shells, tiger shells, &c.

VOLU'TE (*volutus*: *Lat.*), in Architecture, a kind of spiral scroll, formed at each side of an Ionic capital. It is used also in Corinthian and composite orders, but is then of a smaller size, and placed diagonally. In the Corinthian the volutes are more numerous, but smaller than in the composite.

VOMITO'RIA (*Lat.*; from *vomo*, I pour forth), the openings or gates in ancient theatres and amphitheatres, by which the spectators entered and left.

VOR'TEX (*Lat.*; from *verto*, I turn around), a *whirlpool*, formed by the water running rapidly round; there is a cavity in the middle, into which floating bodies are drawn. The word is also applied to a *whirlwind*. In the philosophy of Des Cartes, a *vortex* means a collection of material particles, forming a fluid or ether, and having a rapid rotatory motion round an axis. He endeavoured, by means of this hypothesis, to explain the motions of the heavenly bodies; but it is inapplicable to those which, like the comets, traverse the heavens in all directions. His object was to show that the universe might assume, and preserve its present form, on mechanical principles.

VOTE (*votum*, a wish: *Lat.*), the suffrage or resolve of each of the members of an assembly, where any affair is to be carried by a majority; but more particularly the resolves of any members of either house of parliament.

VOUSSOIRS (*Fr.*), the stones which immediately form the arch of a bridge; their joints should be perpendicular to the curve of the intrados.

VOW (*vœu*: *Fr.*; from *votum*: *Lat.*), a solemn and religious promise, or oath. [See OATH.] The use of vows is found in most religions. They make up a considerable part of the pagan worship, being made either in consequence of some deliverance, under some pressing necessity, or for the success of some enterprise. Among the Jews, all vows were to be voluntary, and made by persons wholly in their own power; and if such person made a vow in anything lawful and possible, he was obliged to fulfil it. Among the Roman Catholics, a person is constituted a religious by taking three vows, that of poverty, chastity, and obedience.——*Vows*, among the Romans, signified sacrifices, offerings, presents, and prayers made for the Cæsars and emperors; particularly for their prosperity, and the continuance of their empire.

VOWEL (*voyelle*: *Fr.*), a letter which does not require the aid of another, for its pronunciation.

VULCAN'IC THEORY (*vulcamus*, fire: *Lat.*), a system which ascribes the changes on the earth's surface to fire; while another, called the *Neptunian*, ascribes the whole to water.

VUL'GATE (*vulgatus*, commonly known: *Lat.*), a very ancient Latin translation of the Bible, which was made from the Greek of the Septuagint. It is the only one acknowledged by Roman Catholics to be authentic.

VUL'PINITE, in Mineralogy, an anhydrous sulphate of lime, containing a little silica. It is found at Vulpino in Italy, and is used by Italian artists for small statues, and other ornamental work, under the name of *marono bardiglio*.

VUL'TURE (*vultur*: *Lat.*), the name of some diurnal accipitrine birds, having an elongated beak, curved only at the extremity, with more or less of the head, and sometimes of the neck, denuded of feathers. The wings being very long are, in walking, curved in a half distended state. The birds are rapacious to an extreme degree, and sometimes feed in the midst of cities unterrified. In India, they are of so much service in chasing away the carcases of animals, that they are unmolested. They prefer food that is tainted to that which is fresh; they are found most numerous in warm climates, and must be regarded as a race of creatures eminently useful in clearing the surface of the globe from putrid remains, which would otherwise infect the air, and produce pestilence. The Egyptian vulture has been sometimes seen in England. Another species, the *Vultur fulvus* or Griffon Vulture, is an inhabitant of Continental Europe as well as the Lammergeyer, *V. cinereus*. Some tropical species are known to seize tortoises, carry them into the air, and then let them drop to the earth, repeating this process until they are killed. The condor of South America is closely allied to the vultures.

W

W, the twenty-third letter of the English alphabet, takes its written form from the union of two V's, and its name of *double u*, from the Roman capital V representing that which we call U. In English it is always followed either by a vowel, or by *h*, as in *when*; or by *r*, as in *wrong*. The *w*, being a strong breathing, is nearly related to all aspirated sounds, and through them again to the gutterals, so that we find *w* and *g* often interchanged in different languages, as in the words *William*, *Guillaume*, &c. In German, *w* is pronounced like an English *v*, *v* having the sound of an *f*. When *w* commences a syllable it is a consonant; in other cases it is a vowel.

WACK'E (*Germ.*), in Geology, an earthy variety of trap with an argillaceous appearance, and resembling hardened clay. Its colours are greenish-grey, brown, and black.

WAD, or **WAD'DING**, a stopple of paper, tow, old rope-yarn, &c. forced into a gun to keep in the powder and shot.

WADD, in Mineralogy, *plumbago* or black lead. Black wadd is an ore of manganese found in Derbyshire, and of four kinds: the fibrous, ochrey, pulverulent, and dendritic.

WAD'SETT, an ancient tenure or lease of land in the Highlands of Scotland. It is a mortgage; and when the mortgagor pays the public burdens, is a *wadset improper*: but when the wadsettee pays them, is a *wadset proper*.

WA'GER (*gages*: *Fr.*), anything pledged on chance. Wagers are valid in law unless rendered expressly void by statute or such as have an immoral tendency. A wager on horse racing was invalid if for more than 10*l.*; but it is now recoverable. Wagers on merely speculative subjects, arising out of circumstances in which the parties have no interest, cannot be recovered; when a wager is illegal, the parties may recover their deposits from the stakeholder.

WA'GER OF BAT'TLE, or **BAT'TEL**, an ancient mode of trial by simple combat, where, in military, civil, or criminal cases, the defendant might fight with the plaintiff to prove the justice of his cause. This relic of barbarism and injustice has been only recently abolished. It was also used in affairs of chivalry and honour.

WA'GER OF LAW, a proceeding in which the defendant in an action of debt by simple contract, took an oath in court in the presence of eleven compurgators, who swore they believed him, that he owed the plaintiff nothing, on which the law allowed him his discharge. This mode of proceeding has been abolished.

WA'GES, the compensation paid to those employed to perform any kind of labour or service; the term is, however, usually confined to the sums paid to artisans, labourers, and servants. Wages are modified by the agreeableness or disagreeableness of the employment; the ease and cheapness, or difficulty and expense, of learning it; its constancy or inconstancy; the great or little trust it supposes; the probability or improbability of success in adopting it. The rate of wages is necessarily liable to great variation; it will naturally increase if the capital to be expended on manufactures, &c., increase to a greater extent than the population; and it will diminish in opposite circumstances; but it never can remain long below what will be sufficient for the sustenance of the labourers, &c., and their families; the rate at which they can support themselves having, in all cases, a serious effect on that of the wages they receive. [See LABOUR].

WAG'TAIL, the name of some small birds belonging to the genus *Motacilla* of ornithologists. They have long tails, to which they give a graceful fanning motion. There are five species in this country.

WAHA'BEES, a fanatical Mohammedan sect which appeared in Arabia at the beginning of the last century under the leadership of Abdul Wahal. They accepted the Koran, but rejected the marginal annotations and the traditionary law. Mahomet was regarded as a mortal man honoured by a divine mission, but they held that to worship at his tomb savoured of idolatry, and they thought it would be right to destroy the sepulchres of saints throughout Arabia and Persia. In many other respects they disagreed with the popular creed, and they attempted to carry out their own views by force. They took possession of Mecca and Medina. Mohammed Ali, the Pasha of Egypt, sent troops against them, but it was only after several bloody contests that they were got under. Some remains of the sect, however, still exist.

WAIFS (*waflan*, to abandon: *Sax.*), in Law, goods found, of which the owner is not known, and which are claimed by the crown or lord of the manor. These were originally such goods as a thief, when pursued, threw away to prevent his being apprehended; but the owner, on complying with certain conditions within a year and a day, was entitled to restitution.

WAIST (*wast*: *Belg.*), in a ship, that part which is between the quarter-deck and forecastle; but in ships where there is no quarter-deck, the waist is the middle part of the ship.——The small part of the body between the breast and hips.

WA'ISTCLOTHS, coverings of canvas or tarpaulings for the hammocks, stowed on the gangways, between the quarter-deck and forecastle.

WAITS, itinerant musicians who played in the streets on the nights of Christmas holidays.

WA'IVER, in Law, the passing by, or declining to accept a thing; applied either to an estate, to a plea, &c. In some cases, where an action of tort and an action of contract both lie, the aggrieved party declines the former, and pursues the latter remedy; this is *waiver of tort.*

WA'IWODE, in the Turkish empire, the governor of a small province or town.

WAKE (*wacian*, to watch: *Sax.*), a *vigil:* the feast of the dedication of the church, formerly kept by watching all night. At present fast days are usually called *wakes* by the English peasantry. The wake was formerly held on the Sunday after the day of the dedication, or more usually on the festival of the saint to which the church was dedicated. In Ireland, this is called the *patron* day, and by the word wake is understood there the observances used by the lower orders in watching a dead body during one or two nights before interment; candles being lighted around it, and the watchers being supplied with tobacco, whiskey, &c.; such wakes were formerly at least but too often scenes of disorder and excess.——The *wake of a ship* is the track it leaves in the water. By her *wake* the sailors are enabled to judge what way the ship makes. If the wake be right astern, they conclude she makes her way forwards; but if it be to leeward a point or two, then they conclude she falls to the leeward of her course. When one ship, giving chase to another, is got as far into the wind, and sails directly after her, they say, she has got into *into her wake.*

WAL'DENSES, in Ecclesiastical History, a sect which derived its name from Peter Waldo, a merchant of Lyons, who preached his peculiar doctrine about the year 1180. They have been confounded with the Vaudois, who existed before them; and with the Albigenses to whom Manichæan tenets have been, though without sufficient authority, imputed. They are believed to have rejected an established succession in the priesthood and the Roman Catholic doctrine of the sacraments; also to have protested against the ecclesiastical abuses of the time, as well as against oaths, lawsuits, warfare, and the accumulation of wealth.

WALES OF A SHIP, an assemblage of strong planks, extending along a ship's sides, throughout the whole length, at different heights; and serving to strengthen the decks and form the curves. They are distinguished into the *main wale* and the *channel wale.*

WALL'-CRESS, the common name of plants belonging to the genus *Arabis*, nat. ord. *Cruciferæ.*

WALL'-EYE, the *Glaucoma*, a disease in the crystalline humour of the eye.——In horses, an eye in which the iris is of a very light gray colour.

WALL'-FLOWER, a hardy evergreen plant of the genus *Cheiranthus*, which, in the wild state, grows in the clefts of rocks and old walls; producing a fine golden-yellow flower, strongly and agreeably scented. When cultivated, it is a beautiful and favourite ornamental plant, the flowers being of various shades, large, and brilliant. There are many species.

WALL'-KNOT, in the Marine, a particular sort of large knot raised upon the end of a rope by untwisting the strands and interweaving them against each other.

WALL PLATE, in Architecture, a piece of timber placed on a wall for girders, joists, and other timbers to rest upon.

WAL'NUT, the fruit of a well-known deciduous tree, the *Juglans regia*, of which the native country is Persia. Previously to the very general introduction of mahogany, the wood of the walnut-tree was extensively used by cabinet-makers and turners; and it is considered superior to every other sort of wood for the mounting of guns. In N. America there are several other species of *Juglans*, of which the Black Walnut (*J. nigra*) and the Butter nut (*J. cinerea*) are the most useful.

WAL'RUS, in Zoology, the *Morse* or sea-horse. [See MORSE.]

WALTZ (*walzen: Germ.*), a national German dance, but now common in England, and other European countries. It is said to have originated in Bohemia.

WAM'PUM, sea-worn fragments of the *Venus mercenaria*, or bivalve shell, used by the American Indians as money or a medium of commerce. These shells are run on a string, and form a broad belt, which is worn as an ornament or girdle.

WANDEROO', in Zoology, a monkey of Ceylon and Malabar. The other monkeys are said to pay it a profound respect; and its appearance is certainly grave and venerable; but it does not seem endowed in any special way.

WAN'LASS, or *driving the wanlass*, an old Law term for driving deer to a stand, that the lord may have a shoot; an ancient customary tenure of lands.

WAP'ENTAKE (weapon take), in Law, a division or district, peculiar to some of the northern counties of England; and answering to the *hundred*, or *cantred*, in other counties. Yorkshire is subdivided into wapentakes. This name had its origin in a custom of touching lances or spears, when the chief or leading man of the hundred entered on his office.

WAPITI DEER, the Red Deer of the Canadians, the *Cervus Canadensis* of zoologists. It is a large but stupid animal, and its flesh is of inferior quality. The male carries five antlers, which are shed annually.

WAR (*wær: Sax.*), a contest between nations or states, carried on by force; either for defence, for redressing wrongs, for the extension of commerce or acquisition of territory, or for obtaining and establishing the superiority and dominion of one over the other. When war is commenced by attacking a nation in peace, it is called an *offensive* war, and such attack is *aggressive.* When war is undertaken to repel invasion or the attacks of an enemy, it is called *defensive;* and such a war is not only justifiable, but laudable.——*Civil War*, a state of internal hostility, in which opposite parties of the same nation contend for the mastery by force of arms.——*Holy War*, a term given to a crusade undertaken for the purpose of delivering the Holy Land, or Judæa, from infidels. These *holy* wars were carried on by most *unholy* means.——*Declaration of*

War. Formal declarations of war, by Heralds, are now out of use; there is at present merely a *Manifesto* [which see]; and the permission of *reprisals* is usually the step which precedes actual hostilities. By the law of nations, enemies who have not been taken in arms, or who have submitted, are not to be put to death; neither are prisoners, except in very extreme cases. Acts of hostility are lawful only when committed by the express or implied command of the state; hence bands of marauders may be treated as banditti, and private citizens taking up arms are liable to be considered as such. The property belonging to the government of a vanquished nation belongs to the victors; but not that of private individuals, unless found at sea. It has been the custom of Great Britain to seize and condemn as droits of Admiralty the property of an enemy found in our ports at the commencement of hostilities.

WARD (*weardian*, to guard: *Sax*), in Law, the heir of the king's tenant *in capite*, during his nonage; whence the term has since been applied to all infants under the power of guardians; or such as are under the control and protection of the lord chancellor, who are called *wards in chancery*.——A certain district, division, or quarter of a town or city, committed to an alderman. There are twenty-six *wards* in London.

WAR'DEN (same *deriv.*), a keeper; as, the warden of a prison, &c.——*Warden of a college*, the head or president.——*Lord Warden of the Cinque Ports* The constable of Dover Castle was appointed to this office, and was made guardian of the adjacent coast by William the Conqueror. The lord warden has the authority of admiral in the Cinque Ports, and their dependencies. He formerly had power to hold a court of admiralty, and courts of law and equity. He was the returning officer of all the ports, and his salary was 3000*l*. per annum. [See CINQUE PORTS]——There is also a *Lord Warden of the Stannaries* [See STANNARIES]

WARD'MOTE, a court kept in every ward in London, usually called the *wardmote court* It has power every year to inquire into all deficiencies with regard to the officers of the ward, to prevent disorders, gaming, &c.

WARD'-ROOM, a room in a ship of the line, appropriated to the principal officers; in frigates it is called the *gun-room.*

WARP (*wearp: Sax*), in Weaving, the threads which are extended lengthwise in the loom, and crossed by the woof.——In Nautical affairs, a rope or towing line, employed in drawing, towing, or removing a boat or vessel.——In Agriculture, a slimy substance deposited on land by rivers liable to overflow; the mud they contain is deposited sometimes to the depth of one or two inches, and contributes greatly to the fertility of the soil; *warping* has been practised on the banks of the Po, and other rivers in the north of Italy, from the earliest times.

WAR'RANT (*guarantir*, to warrant: *Fr.*), in Law, a precept, under hand and seal, authorizing an officer to seize an offender, and bring him to justice.——*Warrant of attorney*, an authority given by a person to an attorney to appear and plead for him; or in a more general sense, that by which a man appoints another to act in his name, and warrants his transaction.——*Search warrant*, a precept authorizing a person to enter houses, &c., to search for stolen or contraband goods, or to discover whether a criminal be there concealed——*Warrant officer* an officer holding a warrant from the navy board; the gunner, boatswain, and carpenter are warrant officers.——*Press warrant*, in the navy, a warrant issued by the admiralty, authorizing an officer to impress seamen

WAR'RANTY (same *deriv.*), in Law, a promise or covenant, by which a purchaser may have satisfaction from a seller, if he sells what is not his own, or that for which he has not a sufficient title. Warranty of real property is obsolete; and, with regard to things personal, no express warranty is now required that the buyer may have satisfaction if the title of the seller was deficient The seller is not obliged to answer for the goodness of an article, unless at the time of sale he has warranted it to be good; or unless he has in any way misrepresented it. Every affirmation made by the vendor, at the time of sale in relation to the goods, amounts to a warranty.

WAR'REN (*garenne: Fr.*; from *wahren*, to protect: *Teuton.*), a franchise or privileged place for keeping beasts and fowls of the warren; hares, partridges, pheasants, and rabbits, to which some had quails, woodcocks, waterfowl, &c. In common language, a *warren* is a surface of poor sandy soil, on which rabbits are kept.

WASH, the fermented liquor, from which spirit is distilled.

WASP (*wæsp: Sax*; from *vespa: Lat*), a genus of hymenopterous insects, the female and neuter of which have powerful and venomous stings. The nests of wasps are highly curious structures, divided into cells, with walls made of vegetable substances, and as they do not lay up honey like bees, they die, or are torpid in the winter. The *hornet* is larger than the common wasp, and forms its nest in holes or roots of trees, but both are equally voracious.

WAS'SAIL-BOWL, a large drinking vessel, in which the Saxons, at their public entertainments, drank health to each other, saying, 'Wæs hæl!'—'Health be to you!' or 'Your health!' It was also a Saxon custom, to go about with such a bowl, at the time of the Epiphany, singing a festival song, drinking the health of the inhabitants, and, of course, collecting money to replenish the bowl. This custom, from which christmas-boxes, christmas-ale, bellmen's verses, and carols, are all, probably, more or less derived, was called *wassailing;* and those who practised it *wassailers.* In some parts of the kingdom, the primitive custom, and its name, are still retained.

WASTE (*Teut.*), in Law, the destruction, or removal of, or injury to something, forming an essential part of an inheritance; as houses, timber, &c. Neglect of repairs is *permissive* or *omissive* waste; actual in jury is *voluntary* or *commissive* waste. *Equitable waste*, comprehends acts not deemed waste at Common Law. The remedy for waste is by action of trespass on the case, by the person in reversion or remainder; this action may be maintained by one having any immediate interest in expectancy; it may be had not only against the tenant, but against any stranger who has committed an act of waste; and will also lie at the suit of one joint tenant or tenants in common against another. An analogous action, called an action for *dilapidations*, may be maintained by a rector or vicar against his predecessor or the executors of his predecessor: and this for *permissive*, as well as voluntary waste.——*Waste land*, a tract not in cultivation, and producing little or no useful herbage or wood. About the end of the last century there were six millions of acres of such land in Great Britain; of which four millions might be brought under the plough; and most of the remainder might be used for growing wood, but much of this has since been enclosed.

WATCH (*wæce: Sax.*), in the Marine, denotes the space of time during which one division of the ship's crew remains upon deck to keep watch, the crew being generally divided into two, or in large ships, into three parts, for this purpose. The watches are termed *starboard* and *larboard* watches. The period of time called *a watch*, is four hours, the reckoning beginning at noon or midnight. There are also what are called *dog-watches*, which last only two hours, and are formed by the division of the watch between four and eight, P.M., into two parts, to break the constant recurrence of three watches at the same hours. ——To *set the watch*, is to appoint that division of the crew which is to enter on the watch.——To *relieve the watch*, is to relieve those on duty, by changing the watch.——*Watch-bill*, a list of the officers and crew who are appointed to the watch; together with the several stations to which each man belongs.——*Watch*, a pocket instrument for measuring time, in which the machinery is moved by a steel spring, coiled up, and acting by various ingenious contrivances. The spring is in a brass box called the barrel; and is combined with a tapering fusee, on which a connecting chain is wound by the key. The spring being fastened at one end to the barrel, and at the other end to an arbor or axle, unwinds off the fusee, turning it, and keeping the watch going; while the action of the fusee accommodates itself, by its varying size, to the varied energy of the spring. [See FUSEE.] The force being thus produced, other wheels are put in motion; and time is exactly measured by the hands on the dial. The watch manufacture consists of almost innumerable departments. When executed in a more perfect manner, for the purposes of navigation, watch is termed a *chronometer* [which see]. Watches are said to have been first made at Nuremberg, as early as 1477; they were originally of various shapes, and must have been very imperfect until the invention of the spiral spring as a regulator to the balance, which took place about the year 1658. The Swiss trade in watches is very considerable; the works are manufactured by the female peasants in the mountainous districts, and are put together in the towns.

WATCH AND WARD (*wæcce*, to watch; and *weærdian*, to guard: *Sax.*), the custom anciently observed of watching by night, and warding or keeping the peace by day in towns and cities, which was first appointed by Henry III. The word *watch*, properly applied to the night; *ward*, to the day.

WATER (*wæter: A.-Sax.*), a transparent and colourless compound fluid, destitute of smell, nearly without taste, and almost incompressible—a pressure equal to 2000 atmospheres occasioning a diminution of only one-ninth of its bulk. It is composed of two substances, neither of which can be exhibited separately, except in the gaseous form; and when aeriform, they are known, the one as hydrogen gas, or inflammable air; the other as oxygen gas, or vital air. These gases, in the proportion of about two measures of hydrogen to one of oxygen, when united chemically, and reduced from the form of air to that of a liquid, constitute the fluid we call *water*. It passes to the solid state at 32° Fahr. When it shoots into ice, it forms in the first place a prism, not very regular in shape, but very long; and undergoes an enlargement in volume. In the act of freezing, too, the greater part of the air, which the water holds loosely dissolved, is expelled. At 212°, under a medium atmospheric pressure, water boils, but returns unaltered to its liquid state on resuming any temperature below this point. All water which has been exposed to the atmosphere (as spring and river water) contains a portion of air, from which it derives a sparkling quality and agreeable taste. It is thus also fitted for supporting the respiration of fishes. A strong attraction is exerted between water and the fixed alkalies, so also between it and the alkaline earths. From the extensive solvent power of water, it is scarcely ever met with pure in nature; every kind being impregnated either with saline, earthy, or mineral substances. The simple waters are the following:—1. *Distilled water*. This is the lightest of all others, containing neither solid nor gaseous substances in solution, is perfectly void of taste and smell, colourless and transparent, has a soft feel, and wets the fingers more readily than the other. As it freezes exactly at 32° of Fahrenheit, and boils at 212° under the atmospherical pressure of 29·8 inches; these are made use of as the standard points for thermometrical division; and its weight being always the same under the mean pressure and temperature, it is employed for the comparative standard of specific gravity. 2. *Rain water*, the next in purity to distilled water, is that which has undergone a natural distillation from the earth, and is condensed in the form of rain. It so nearly approaches absolute purity, when unmixed with the sulphate of lime and calcareous matter which it imbibes when it falls in towns, from the mortar and plaster of the houses, as probably to be equal to distilled water for every purpose except in the nicer chemical experiments. 3. *Ice* and *snow-water*. This equals rain-water in purity, and when fresh melted, contains no air, which is expelled during congelation. 4 *Spring-water*. Under this comprehensive class are included all waters that rise from some depth beneath the soil, and are used at the fountain head, or at least before they have run any considerable distance, exposed to the air. When the ingredients are not such as to give any peculiar medicinal or sensible properties, it is distinguished as a hard or a soft spring, sweet or brackish, clear or turbid, or the like. By far the greater number of springs are cold; but as they take their origin at some depth from the surface; and below the influence of the external atmosphere, their temperature is, in general, pretty uniform during every vicissitude of season, and always several degrees higher than the freezing point. The water of deep wells is much harder than that of springs which overflow their channel; for much agitation and exposure to air produce a gradual deposition of the calcareous earth, and hence spring water often encrusts to a considerable thickness the inside of any kind of tube through which it flows, as it arises from the earth. The specific gravity of these waters is also, in general, greater than that of any other kind of water, except that of the ocean. Springs that overflow their channel, and form to themselves a limited bed, pass insensibly into the state of river water, and thus become altered in some of their chemical properties. 5. *River water*. This is in general much softer and more free from earthy salts than the last, but contains less air of any kind; for, by the agitation of a long current, and in most cases a great increase of temperature, it loses common air and carbonic acid, and much of the lime which it held in solution. Its specific gravity, in this way, becomes less, its taste is not so harsh, but less fresh and agreeable, and out of a hard spring is often made a stream of sufficient purity for most of the purposes where soft water is required. Some of the mountain lakes and rivulets, however, which take their rise from a silicious rock, and flow in a sandy or stony bed, are from the outset remarkably pure 6. *Stagnant waters*. These generally abound with the remains of animal and vegetable matter undergoing decomposition; and as they are usually shallow, they receive the full influence of the sun, which further promotes all the changes that are going on within them. The decidedly noxious effects produced by the air of marshes and stagnant pools have often been supposed to extend to the internal use of these waters. It ought, however, to be observed that they are generally soft, and many of the impurities are only suspended, and therefore separable by filtration. 7. *Mineral waters*, are unfit for common purposes; and derive their peculiar properties from the substances which they hold in solution. But there are some, such as Malvern water, remarkable only for extreme purity. Mineral waters are of various kinds. [See MINERAL WATERS.] Some are effervescent or sparkling, from containing carbonic acid. Chalybeate springs are more or less tonic and astringent. Saline springs aperient and alterative. Mineral waters contain their active ingredients in very minute quantities. Much of the advantage to be derived from a course of mineral waters is, undoubtedly, due to the strict attention paid to diet, to bodily exercise, mental relaxations, and regular hours; and, in some cases, to the diluent effects of pure water—which explains the advantage of that of Malvern, in calculous complaints, &c. The great reservoirs of water on the globe are the ocean, seas, and lakes, which cover more than two-thirds of its surface; from these, it is raised by evaporation: and uniting with the air in the state of vapour, is wafted over the earth, ready to be precipitated in the form of rain, snow, or hail. *Sea water* is remarkably constant in the nature and relative quantities of its ingredients. Its spec. grav. is very considerable, since it contains more than *three per cent.* of solid matter; which consists chiefly of common salt, chloride of magnesia and lime, together with traces of chloride of potassium, chloride of ammonium (sal ammonia) carbonate of lime, bromide, and often iodide of magnesium. [See ATMOSPHERE, HYDROGEN, OXYGEN, GAS, RAIN, RIVERS, &c.] ——In Manufactures, a certain appearance, imitating water: produced on silks, mohairs, &c Watering causes the exhibition of a variety of undulated reflections, and plays of light.——WATER, in Marine phraseology, denotes the state of the water at sea: as *high-water*, *low water*, *foul water*, *dead-water*, &c ——WATER, in Mineralogy, a term used by lapidaries for the lustre of precious stones.——*Water of separation*, a name given by refiners to aqua fortis, because it separates gold from silver.

WATER BAILIFF, in Law, an officer in seaport towns who searches ships.

WATER-BETONY, the *Scrophularia aquatica* of botanists, a perennial.

WATER-COLOUR PAINTING, that in which the colour is levigated with water and gum. It has been latterly carried to great perfection, and nearly rivals oil-painting in everything but durability.

WATER-COURSE, any natural or artificial stream of water; as a river, a canal, and the like.

WATER-CRESS, the *Nasturtium officinale* of botanists, nat. ord. *cruciferæ*, a perennial plant that grows on the margin of clear streams, or even partly immersed in the water. Great quantities are consumed as salad; and of late years it has been cultivated to a considerable extent. The plant is also employed in medicine as an antiscorbutic.

WATER-DEVIL, a name given by some to the Larva of a British beetle, a species of *Hydrophilus*.

WATER-GAVEL, in old writers, a rent paid for fishing, or any other benefit received from some river.

WATER-GLASS, a solution of silicated

soda, which is sometimes obtained by dissolving broken flints in a solution of caustic soda at a temperature of 800° F., assisted by pressure. Another mode of producing soluble glass is to melt together, in a reverberating furnace, white sand and dry carbonate of soda. After six hours of strong firing, the melted charge runs out as perfect glass, from which bottles, &c., may be blown and moulded. Boiling water, however, dissolves this glass. Some of the uses of water-glass are mentioned under STEREOCHROME and STONE, ARTIFICIAL. It is also employed in the manufacture of soap to the saving of oil and tallow.

WA'TER-LEVEL, a contrivance for finding the level of roads or grounds, by means of a surface of water or other fluid, founded on the principle that water always finds its own level. It consists of a long wooden trough, which, being filled with water, shows the line of level.

WATER-LILY, the name of some aquatic plants belonging to the genus *Nymphæa*, the flowers of which are large, and contain numerous petals, so as to appear double. In the morning, they raise themselves out of the water to expand, and close again, reposing upon the surface, in the afternoon.

WA'TER-LINE, a horizontal line supposed to be drawn about a ship's bottom, at the surface of the water. When the cargo is on board, it is called the *load water line;* otherwise, the *light water line*.

WA'TER-LOGGED, a term applied to a ship when, by leaking, and receiving a great quantity of water into her hold, she has become so heavy as to be totally unmanageable. Having lost her buoyancy, she yields to the effect of every wave passing over her deck.

WA'TER-MARK, the utmost limit of the rise of the flood.——The mark visible in paper, and which is made in the manufacturing. [See PAPER.]

WA'TER-MELON, the *cucumis citrullus* of botanists, a plant belonging to the nat. ord. *cucurbitaceæ*. To bring it to perfection, this plant requires a warm climate, and a dry, sandy, warm soil. The fruit is remarkably rich, and it abounds with a sweetish liquor.

WA'TER-MILL, a mill whose machinery is moved by water: and thus distinguished from a wind-mill, steam-mill, &c. Water-mills for grinding corn were invented by Belisarius, while besieged in Rome by the Goths, 555.

WA'TER-ORDE'AL. [See ORDEAL.]

WA'TER-ORME, in the Marine, an epithet for the state of a ship which has barely a sufficient depth of water to float her off the ground.

WA'TER-POISE, in Mechanics, an instrument formerly used for trying the strength of liquors; the hydrometer, &c., are now employed for the purpose.

WA'TER-SHED, the line of, or the ridge line of a district, is that line from which the ground slopes downwards on each side. Rain falling on this line will run in opposite directions. Such a line divides one river-basin from another, and one valley from another. Its course is usually very irregular both in altitude and azimuth.

WA'TER-SHOOT, in Botany, a sprig which springs out of the root or stock of a tree.

WA'TER SPOUT, an aqueous meteor, most frequently observed at sea; rising at first in the form of a small cloud, which afterwards enlarges, and, assuming the shape of a cone, with its apex downwards, is driven furiously by the wind, and is often accompanied with thunder and lightning; causing destruction, when it bursts, to whatever happens to be within the sphere of its action. When it appears at sea, there are generally two cones, one projecting from the cloud, the other from the water below it; and they sometimes unite, their union having been observed to be accompanied with a flash of lightning; but more usually disperse while separate. It is probably caused by a whirlwind of extreme intensity.

WA'TER-TABLE, in Architecture, a projection or horizontal set-off, in a wall, intended to throw off the water from the building.

WA'TER-WAY, in a ship's deck, a piece of timber, forming a channel for conducting water to the scuppers.

WATER-WHEEL, in Hydraulics, an engine for raising water: [See PERSIAN WHEEL]. Also a wheel turned by the force of water, and used for giving motion to machinery. The water-wheel is of two kinds; the *vertical* and the *horizontal*, or turbine [which see]. Vertical water-wheels are either over shot, under shot, or breast wheels. The *overshot wheel* is moved almost entirely by the weight of the water, which it receives and retains for some time in its buckets. The *undershot wheel* is moved almost entirely by the momenture of the water, which strikes against its floatboards. The *breast wheel* is moved both by the weight and momenture of the water, which it receives at about half its height, and which is retained by its floatboards and the curved masonry behind them, until it passes out, under the wheel below.

WA'TER-WORKS, in general, denote every description of machinery employed in raising or sustaining water; in which sense, water-mills of all kinds, sluices, aqueducts, &c., may be so called. The term water-works, however, is more particularly used for such machines as are employed only in raising water.

WA'TER OF CRYSTALLIZA'TION, that definite quantity of water which enters into the composition of most crystallized salts, and without which they cannot retain their crystalline form. It is not necessary to crystallization in all cases: thus crystals of nitre and sulphate of potash contain no water; on the other hand, some crystallized salts contain so much, that, when heated, they melt in it, forming in reality hot salinated solutions.

WAT'TLE, the fleshy excrescence that grows under the throat of a cock or turkey or a like substance on a fish. Also, a twig or flexible rod. Also, a name given to certain species of *Acacia* in Australia.

WAVE (*wæge: A.-Sax.*), the alternate elevation and depression of the surface of a fluid. When this surface is pressed down at any part, the adjoining parts rise, but sink again by the action of gravity; and, acquiring a velocity due to their height, descend below the original level, communicating in their turn a pressure to others near them, which rise and sink in a similar way; and thus a reciprocating motion is produced. When the depth is sufficient to allow the oscillations to proceed unimpeded, no progressive motion of the fluid takes place; but, when free oscillation is prevented by a shelving shore, the interposition of a rock and the columns in deep water are not balanced by those in shallower, and therefore acquire a progressive motion towards the latter, forming *breakers*. When caused by the agitation of a small portion of the fluid, by, for example, a stone thrown into it, the waves appear to advance in concentric circles, their height diminishing as they proceed; but there is no progressive motion of the fluid itself, as will be shown by any light body floating on its surface. The whole seems to roll onward, but in reality each particle of water only oscillates with a vertical ascent and descent. Two sets of waves will cross each other without any mutual interruption. Waves meeting with an obstacle, such as a wall, &c., will be reflected backwards, according to the laws to which light and sound are subjected; if there be a small aperture in the obstacle, the waves will be propagated beyond it, and diverge as from a centre. Waves at sea, caused by the wind, have a progressive as well as an oscillatory motion; except increased by the wind suddenly veering about, they do not exceed about six feet in height; and the effect of the wind never reaches to a greater depth than about 30 or 40 feet. The progressive wave sent forward by a floating body, or generated in any other way, differs entirely in its character and phenomena from the oscillatory waves of the sea. Its velocity varies as the square root of the depth of the water; and hence a wave of high water of a spring tide travels faster than a wave of high water of a neap tide; and any change in the depth of rivers produces a corresponding change in the interval between the moon's transit and the hour of high water.

WAVED, or WAVY (same *deriv.*), in Heraldry, *indented*.

WA'VELLITE, in Mineralogy, a hydrated phosphate of alumina, called also *Hydrar*-[illegible] It is usually found in crystals, that adhere and radiate; forming hemispherical or globular concretions; from a very small size to an inch in diameter.

WAX (*weaxe: Sax.*), in Natural History, the substance with which bees build their cells. They carry the *farina* or *pollen* on their hinder legs; but, according to Reaumur, this dust does not contain any real wax; nor is this latter substance produced by the mixture of the farina with a glutinous liquor, by trituration, or by any other mechanical process. In reality, it constitutes the food of the *Larvæ*. After long and attentive observation, this naturalist found, that when bees eat the pollen, it is converted, by an animal process, into wax: bees fed entirely on sugars will still produce wax. There is a wax that forms the varnish, with which the leaves of several trees are coated, and is found on some berries, as those of the *Myrica Cerifera*, forms the green fecula of many plants, particularly of the cabbage, and may be extracted from the pollen of most flowers; but it slightly differs from bees' wax. The latter is the secretion of a certain organ, situated on the sides of the median line of the abdomen of the bee: each individual has eight wax sacs or pouches. Wax from the comb has the smell of honey, and is of a yellow colour. It is purified and bleached, by melting it with hot water or steam, and then exposing it in thin ribbons to the action of air, light, and moisture. When purified, wax is white, and, if in thin segments, translucent; it has neither taste nor smell; its specific gravity is about 0·963. It liquefies at 154·5° Fahr.; but it becomes plastic at 86°; at 32° it is hard and brittle. It consists of two substances, which are separated by boiling alcohol, one of them, *myricin*, being left behind. The alcoholic solution deposits *cerin* on cooling. Both these proximate principles are composed of carbon, hydrogen, and oxygen. Wax is often adulterated with starch; this may be detected by oil of turpentine, which dissolves the wax, and leaves the starch. It is still more frequently adulterated with mutton suet, this is detected by dry distillation; when, if tallow is present, sebacic acid will be formed, and will cause a precipitate on acetate of lead. It is also adulterated with stearine or stearic acid; this may be detected by the odour of tallow, caused by heating it highly; also by its crumbly texture. Lastly, it is adulterated with spermaceti, which takes away its peculiar pearly lustre, and renders it more soft and fusible. [See BEE.]

WAX-FOSSIL, or *Ozokerite*, a brownish mineral, found in Moldavia, having several of the characters of bees' wax.

WAX-MYRTLE, in Botany, the *Myrica cerifera*, or Bay-berry, a North American shrub, the berries of which are covered with a greenish wax, called myrtle-wax, or bay-berry tallow; it is slightly different from bees' wax. [See WAX.]

WAX-PALM, in Botany, the *Ceroxylon andicola*, a species of palm growing on the Andes, the stem of which is covered with a secretion, consisting of two-thirds resin and one-third wax.

WAX'-WORK, figures formed of wax, in imitation of real persons. Wax is used with great success in representing *anatomical* details.

WAY, the Nautical term for progress; when a ship is advancing, she is said to have *way* upon her: when stationary, to have *no way*.

WAYS AND MEANS, the financial resources to meet the public expenditure; or supplies voted by parliament.

WEALD-CLAY (*weald*, a wood or grove: *A.-Sax.*), in Geology, a tenacious blue clay, which forms the sub-soil of the wealds of Kent and Sussex. In it are contained subordinate beds of sandstone and shelly limestone, with layers of septaria of argillaceous iron-stone. The *Wealden strata* include the Weald-clay (freshwater) and the Hastings sand group (marine). They form the inferior division of the lower Cretaceous or Neocomian series.

WEATHER (*wether: Sax.*), the state of the air or atmosphere with respect to heat or cold, wetness or dryness, calm or storm, &c. [See AIR, ATMOSPHERE, CLOUD, RAIN, STORMS, &c.] Mankind, in all ages, have supposed that the weather is influenced in some way by the moon. This belief, however, has no foundation; for she cannot act on the earth by *reflecting* the solar rays, since her light is only the 100,000th part of that of the sun; and the heat she causes is utterly inappreciable; nor by her *attraction*, since the effect of this on the air, which has so little density, must be extremely feeble; nor, lastly, by some obscure emanation, since the most careful meteorological observations have never detected any such thing. The registers kept at the various observatories show that the moon's phases are not connected in any way with the weather.

WEATH'ER CLOTHES, in a ship, long pieces of canvas or tarpauling used to preserve the hammocks from injury by the weather when stowed; or to defend persons from the wind and spray.

WEATH'ER-GAUGE, or **WEATH'ER-GAGE**, a naval term; a ship is said to have the *weather-gauge* of another when she is at the windward of her.

WEATH'ER-HELM. A ship is said to carry a *weather-helm* when she is inclined to come too near the wind.

WEATH'ERING, a geological term, signifying the action of meteoric influences (rain, frost, the oxygen of the atmosphere, &c.) upon the crust of the globe. This action is always one of degradation.

WEATH'ER-TIDE, the tide which sets against the lee side of a ship, impelling her to windward.

WEAV'ER BIRDS, the popular name given to a tribe of birds belonging to the finch family, on account of the skill they display in forming their nests. They are natives of hot climates in the old world. The common weaver bird (*Ploceus Baya*) lives in India, and constructs a pendent nest shaped like a retort, specimens of which are often seen in museums. It usually hangs from the leaf of a tall palm tree. The grasses or leaf strips of which it is composed are very artistically plaited together, and so substantial as to defy the heaviest rains of the monsoons. The Whydah (or Widow) birds, of the western coast of Africa, belong to this tribe.

WE'AVING (*wevan*, to weave: *Sax.*), in Manufactures, the act or art of forming cloth in a loom, by the union or intertexture of threads; which is done by crossing the threads by means of a shuttle. The threads first laid in length are called the *warp;* those which cross them in the direction of their breadth are called the *weft* or *woof.* Weaving is an art of great antiquity, and gives employment in all nations to a large portion of the population. In England, Leeds is the centre of woollen cloth weaving; Manchester of cotton weaving; Macclesfield of silk weaving; Nottingham of stocking weaving; and Kidderminster of carpet weaving. The machinery used for weaving in the earliest times, though perhaps rude in its construction, was, in principle, similar to that still in use; and the process of fulling and preparing the cloth seems to have resembled the modern practice in every particular, except that of shearing the nap, with which the ancients do not appear to have been acquainted. Muslins are to this day manufactured by the primitive loom in India, probably without alteration of the form in use during the earliest ages of its invention. In ancient times, it is probable that only enough cloth to form a single dress was woven at once; since ancient records do not speak of its being sold by measure. The manufacture of flexible stuffs by means of machinery, operating on a large scale, is an invention of the last century; it has given birth to some of the most elaborate combinations of mechanism, and constitutes an important source of our national wealth. The jaquard loom, a most admirable contrivance for saving time and simplifying the process of weaving silks, &c., in complicated patterns, is likely to be superseded by a more simple machine, in which electro-magnetism is most ingeniously applied to the production of complicated movements.

WEB'-FOOTED, in Natural History, *palmiped*, or having feet like a goose or duck.

WEDGE (*wegge: Belg.*), in Geometry, a prism with triangular bases.——In Mechanics, one of the six mechanical powers, reducible to the inclined plane, and governed by the same laws. It is used sometimes for raising bodies, but more usually for dividing or splitting them; in the former case, the wedge is pushed under the body to be raised, but the effect is still that of an inclined plane, for the result is the same, and is estimated in the same way, whether the wedge is pushed *under* the load or the load is pushed *over* the wedge. When a wedge is driven forward by percussion, the power which acts upon it cannot be estimated with accuracy, on account of the friction, which is very considerable. This, however, is greatly diminished, for an instant, by the tremour caused by the blow; cutting and piercing tools are generally constituted on the principle of the wedge.

WED'NESDAY (*wodensday: Sax.*), the fourth day of the week; consecrated by the Scandinavians to Woden, a deity that corresponded with Mercury of the Greeks and Romans.——*Ash Wednesday*, the first day of Lent. Some think the day to have received this name from the custom in the early ages of the church, of penitents appearing in sackcloth and with ashes on their heads.

WEED (*weod*, tares: *Sax.*), the general name of any plant that is noxious or useless. The word therefore has no definite application to any particular plant or species of plants; but whatever kinds spring up in fields or gardens that are injurious to crops come under the appellation of *weeds*.

WEEK (*weoc*: *Sax.*), a cycle of seven days; the first day, Sunday, being the Christian festival to celebrate the Resurrection; and the seventh, Saturday, being the sabbath of the Jews. [See SATURDAY and SUNDAY.] The Greeks did not divide the year into weeks, nor the Romans, until after the reign of Theodosius. Some believe this division to have been suggested by the phases of the moon; but others, with greater probability, by the seven planets known in ancient times, the days of the week being universally called after them. The Latin names of the days are still retained in legislative and judicial acts in this country.

WEE'VIL (*wefel*, a grub: *Sax.*), in Entomology, a small coleopterous insect of the *curculionidæ*. The corn-weevil (*calandra granaria*) does great damage to wheat or other corn, by eating into the grain and devouring the farinaceous parts.

WEIGHT (*wægan*, to weigh: *Sax.*), in Experimental Philosophy and Commerce, the measure of the force by which any given portion of matter gravitates to the earth. The determination of weight, like that of extension, consists in comparison with some known standard. Two kinds of weight are used in England, the *avoirdupois weight*, in which the pound consists of 16 ounces, each ounce containing 437½ grs., in all 7,000 grs.; and the *troy weight*, in which the pound is divided into 12 ounces, each ounce containing 480 grs., in all 5,760 grs. *Apothecaries weight* is troy weight differently divided. The unit of French weight is a *gramme*, equal to 15·434 grs.——*Weight*, in Mechanics, the resistance to be overcome by a machine.

WEIR (*wer*: *A.-Sax.*), an embankment or dam of stone or timber placed across the channel of a stream for various purposes, such as the supplying a mill with water at a dry season, or the production of a reach of deep water for vessels where the river is shallow.

WELD, the *Reseda lutea* of botanists, a wild British plant, the stalk and root of which are used in dyeing bright yellow and lemon colours.——*Weld* (*æld*, fire: *Sax.*), in Ironworks, to unite or hammer into firm union two pieces of metal softened by heat.

WELL (*welle*: *Sax.*), a cylindrical excavation sunk perpendicularly into the earth to such a depth as to reach a supply of water, and walled with stone or brick to support the earth. [See ARTESIAN WELLS.]——*Well*, in the Military art, a shaft which the miner sinks under ground, with branches or galleries running out from it, either to prepare a mine, or to discover and counteract the enemy's mine.——In Ship-building, a small enclosed place, near the mainmast; extending from the bottom of the ship to the principal gun deck and containing the pumps.

WELLINGTO'NIA, is the botanical name of a lofty coniferous tree, an inhabitant of California. A specimen was found of the enormous height of nearly 400 feet, and the age of it was estimated at 4,000 years.

WER'EGILD (*Sax.*), in Anglo-Saxon Law, the *were*, or compensation paid by a delinquent to the party wronged, or his relations, for injuries committed against the person. The *eorls*, or nobility, were to be paid six times as much as the *ceorls*, or commonalty. Weregild was usual among all the Teutonic and many of the Celtic tribes, and is mentioned by Tacitus in his account of the ancient Germans.

WER'NERITE, a mineral, consisting of silicate of alumina, lime, and oxide of iron. It is found massive, and crystallized in octahedral prisms with four-sided pyramidical terminations, disseminated in rocks of feldspar. It is of a grayish or olive-green colour, with a pearly lustre, and melts into a white enamel.

WEST (*Sax.*), one of the cardinal points, being that point of the horizon where the sun sets at the equinox, or any point in a direct line between the spectator or other object, and that point of the horizon. In a less strict sense, it is that region of the hemisphere near the point where the sun sets when in the equator.——Formerly the empire of Rome was called the empire of the *West*, in opposition to the empire of the East, the seat of which was Constantinople.

WHALE (*hwale*: *Sax.*), the name of some cetaceous marine mammals belonging to the families *Balænidæ* and *Physeteridæ* of zoologists. The latter include the SPERM whale family. In the former are placed the genera *Balænoptera* (see RORQUAL) and *Balæna*. The latter genus, distinguished by the absence of a dorsal fin and by the smoothness of the belly, includes the Greenland or Right Whale (*B. mysticetus*), so much sought after for the oil extracted from its blubber, and for the material termed whale-bone, which forms plates in the upper jaw. This whale has been taken nearly 100 feet long. Animals of such enormous strength and magnitude, we might imagine, would spread terror and devastation all around them, and make an indiscriminate slaughter of the inferior tribes. No creature, however, is less voracious than the common whale; little animal substance is ever found in its stomach; it feeds, as some allege, upon different insects that float on the surface; according to others, upon the medusa or sea-blubber. Its food, we are certain, must be minute, for the capacity of its throat does not exceed four inches! a size beyond all proportion smaller than that of other large aquatic animals. To a slender appetite the whale adds peaceable and harmless manners; it pursues no other inhabitant of the waters, but leads an easy and quiet life on the bosom of the waves, and is inoffensive in proportion to its ability to do mischief. [See FISHERIES.]

WHEAT (*hwæte Sax.*), a plant of the genus *Triticum*, and the seed of the plant, which furnishes a white flour for bread, and is the grain most generally used by the human race, except in those countries where rice forms the principal article of food. The varieties of wheat are numerous, though the difference between each kind is not very remarkable. The culture of wheat, from time immemorial, and in different soils and climates, has produced these varieties; the chief and most permanent of which are the red and white grained, and the spring wheat, which is generally red. Wheat yields a greater proportion of flour than any other grain, and is also more nutritive. Gluten is so essential an ingredient in bread, that fermentation cannot go on without it; hence the inferiority of wheat in wet seasons, and when it is blighted or ill ripened, this element being then deficient in quantity; and hence also the advantage of having a stock of old grain. The straw of wheat, from dry, chalky lands, is manufactured into hats. Leghorn hats are made from a bearded variety of wheat, not unlike rye, raised on poor sandy soils, on the banks of the Arno, between Leghorn and Florence, expressly for this manufacture. It does not grow above eighteen inches in length, is pulled green, and bleached, like flax, on the gravelly bed of the river. The straws are not split, which renders the plait tougher and more durable.

WHEAT'EAR, the English name of the *Saxicola œnanthe* of ornithologists, a small bird belonging to the same family as the redbreast and redstart; called also *white-tail* and *fallow finch*. It comes to our shores in the spring, and being an excellent article of food, immense numbers are annually taken, particularly on the South Downs of Sussex.

WHEEL (*hweol: Sax.*), in Mechanics, a simple machine, consisting of a round piece of wood, or metal, which revolves on an axis. The wheel has an important place in most engines; it is of an assemblage of wheels that most engines are composed. The centre of a wheel is like the fulcrum of a lever, and a simple action merely transfers the force on one side to the other side; but if wheels are so connected as to diminish velocity, then power is gained.——*Wheel*, in the military art, is the word of command, when a battalion or squadron is to alter its front either one way or the other. An order to *wheel to the right*, directs the man in the right angle to turn very slowly, and every one to wheel from the left to the right, regarding him as their centre; and *vice versâ*, when they are to *wheel to the left*.——*Wheel*, in a ship, the wheel and axle, which move the tiller.——*Water-wheel*, in Hydraulics, one used to obtain a motive power from water. [See WATER-WHEEL.]

WHEEL-WORK. Of all the modes of communicating motion, the most extensively useful is the employment of wheel-work; which is capable of varying its direction and its velocity without any limit. When the pressure on the machinery is not very considerable, the wheels and axles are allowed to work by the friction of their surfaces, which is increased by cutting the wood so that the grains of the surfaces in contact shall run in opposite directions; also by gluing buffed leather upon the surfaces of the wheels and axles. There are other ways of transmitting the force of each axle to the circumference of the succeeding wheel, when the work to be done requires considerable force. One of these is, by ropes, straps, bands, or belts, which are placed round the circumference of the wheels that are to act upon each other. The action is in this manner transmitted by the tension of the band, &c., and rendered effective by friction with the circumferences on which it is rolled. Wheels and axles connected in this manner are called *band-wheels*. When this method is used, a wheel may communicate a motion, which may be either *direct* or *reverse*, also more or less rapid, to another at a considerable distance; and the relative velocities may be alterable *at pleasure*, by using two frusta of cones, the narrow end of one being placed opposite to the wide end of the other. When any machinery is to be occasionally thrown out of action, the wheel or *drum* which drives it, is capable of connection with either a *fast*, or a *loose pulley*; in the former case, motion is communicated to the machinery; in the latter, the loose pulley only is turned round by the prime mover, when bands would be liable to slip from want of sufficient friction, on account of the greatness of the resistance; or when a very accurate motion is required, toothed wheels are used. [See TEETH OF WHEELS.] The teeth are sometimes cast on the wheel, sometimes are fixed to it, and sometimes are cut by machinery. When two wheels of very unequal size act together, the larger is termed a wheel, and the smaller *pinion* wheels, are denominated spur, crown and bevel gear, according to the position of their teeth. If the latter are perpendicular to the axis of the wheel, and in the direction of its radii, it is called a *spur-wheel*. If the teeth are parallel to the axis of the wheel, and therefore perpendicular to its frame, it is called a *crown-wheel*. Two spur-wheels, or a spur-wheel and pinion which work in one another, are always in the same plane, and have their axes parallel; but when a spur and crown-wheel are in connexion, their planes and axes are at right angles. When the teeth are oblique to the plane of the wheel, it is called a *bevel-wheel*, the use of which is to produce a rotatory motion round one axis, by means of a rotatory motion round another which is oblique to it; when the axes are at *right angles*, the wheels used are termed *mitre wheels*. When a varying velocity is to be produced by a uniform force, *excentric square*, and other shaped wheels are sometimes made to act together; they remain connected on account of the sum of the radii of the parts, actually in contact, being always the same. An arrangement is sometimes made for separating wheels which are intended to turn each other, and for reconnecting them at pleasure; the wheel are said to be thrown by these operations *out of gear* and *into gear* again. One of the simplest modes of effecting this is to slide one of the wheels along its axis, so that it ceases to be opposite to the other.

WHEEL AND AXLE, in Mechanics, one of the mechanical powers, reducible to the *Lever*. It consists of a wheel, at the circumference of which the power acts, and an axle, at the circumference of which the weight acts. Provided the power, in moving, describes a circle, a wheel is not required, a winch handle, &c., will answer instead of it. The wheel and axle form a lever with unequal arms, which never gets out of action; or more strictly, a series of levers which have a common centre; but of which only one acts at a time, that one whose arms are, at the moment, perpendicular to the direction of the power and weight. When there is equilibrium, the power multiplied by the radius of the circle which it describes, is equal to the weight multiplied by the radius of the axle. The mechanical effect of this machine may be increased either by increasing the radius of the wheel or diminishing that of the axle.

WHEEL, BREAKING ON THE, a punishment formerly inflicted in France and other countries. It consisted in fastening the criminal to a cartwheel, or a frame made in the form of a St. Andrew's Cross; the executioner then broke his legs with blows of an iron bar, and sometimes caused his immediate death with blows on the chest or stomach, called *coups de grace* (merciful blows). He was then left to expire, if not already dead, with his legs doubled up under him. Sometimes the criminal was strangled after the first two or three blows.

WHEELS OF CARRIAGES. Wheels are applied to carriages for the purpose of diminishing friction, and causing them to pass over elevations or depressions in the road more easily. The larger the wheel the less the friction; also the less it sinks into a rut, and the more easily it is drawn over an obstacle, since the longer the curved inclined plane, along which the centre of gravity, or, which is the same thing, the centre of the wheel, is lifted in passing over it, the radius of this curve being the radius of the wheel.

WHEE'ZING (*hiveosan*, to breathe with difficulty: *A.-Sax.*), in the Veterinary Art, a disordered respiration in horses; arising from the narrowness of the bronchial passages.

WHELK, the *Buccinum undatum* of Conchologists, a gasteropod mollusc with a spiral shell, common on our coasts, and used extensively for human food and for bait.

WHET'STONE (*hwettan*, to whet: *Sax.*), or Novaculite (*novacula*, a whetstone: *Lat.*), in Mineralogy, so called from its property of whetting or sharpening steel. It is a talcy slate, containing silica; to the particles of which, though not perceptible, its efficacy is due.

WHEY (*hwæg*: *Sax.*), the serum or watery part of milk, which remains after the cream and coagulable matter of that fluid are removed, either by churning, or by separating it with rennet, vinegar, cream of tartar, &c.

WHIG (same *deriv.*), one of a political party which had its origin in England in the 17th century, in the reign of the Stuarts, when great contests existed respecting the royal prerogatives. Those who supported the king in his high claims were called *Tories*, and the advocates of popular rights were called *Whigs*. The name was given to the latter, on account of their principles being considered insipid by the Tories, who advocated absolute power and indefeasible hereditary rights in the monarch. [See TORY.]

WHIN DYKES, in Mineralogy, dykes, banks, or natural walls of whin-stone; a species of basalt, found in various parts of the world, but nowhere on so grand and stupendous a scale as on the Scotch and Irish coasts.

WHIP-POOR-WILL, the *antrostomus vociferus* of ornithologists, one of the goat-suckers, a nocturnal bird of North America, which derives its name from its cry. When engaged in its nightly rambles, it is seen to fly within a few feet of the surface of the earth, in quest of moths and other insects. During the day these birds retire into the darkest woods, where they pass the time in silence and repose, the weakness of their sight compelling them to avoid the glare of light.

WHIRL POOL, a vortex where the water moves round in a circle. Those in rivers are very common, from various accidents, and are usually very trivial, and of little consequence. In the sea they are more rare, but more dangerous. The most celebrated of these are the Euripus, near the island of Eubea, in the Grecian Archipelago; Charybdis, in the strait between Sicily and Italy; and the Maelstrom, off the coast of Norway. Their dangers seem to have been exaggerated. They are produced by the meeting of currents, which run in opposite directions.

WHIRL'WIND, an exceedingly rapid and impetuous wind that rises in a whirling direction, and continues in the same way for some time. Whirlwinds have both a progressive and a circular motion; they usually rise after calms and great heats; and occur chiefly in the warmer latitudes. [See WIND, STORMS, &c.] They are ascribed by some to electricity, but are considered by others as formed by the meeting of currents of air which are moving in opposite directions in the same manner as whirlpools are produced in water.

WHIS'KEY, a well known spirituous liquor, distilled generally from barley; but sometimes from wheat or maize, as is the case in the United States. The word is a corruption of the first part of a Celtic phrase which signifies 'water of life.'

WHIST, the most perfect game at the card table, requiring great attention and silence, whence its name. It is played by four persons, who cut for partners; the two highest and the two lowest are together, and the partners sit opposite to each other; the person who cuts the lowest card is to deal first, giving one at a time to each person, till he comes to the last card, which is turned up for the trump, and remains on the table till each person has played a card. The person on the left-hand side of the dealer plays first, and whoever wins the trick is to play again, thus going on till the cards are played out. The ace, king, queen, and knave of trumps are called *honours;* whichever side holds three of these honours reckons two points towards the game, or for the whole of the honours four points, the game consisting usually of ten points. The honours are counted after the tricks; all above six tricks reckoning towards the game.—— In this game, *finessing* means endeavouring to gain an advantage thus; when a card is led, and you have the best and third best of that suit, you put your third best card upon that lead, and run the risk of your left-hand adversary having the second best; if he has not, which is 2 to 1 against him, you are then sure of gaining a trick. *Forcing* means obliging your partner or adversary to trump a suit of which he has none. *Long trump* means having one or more trumps in your hand, when all the rest are out. *Loose card* is a card of no value, and consequently the most proper to throw away. *Points*, ten of them make a game of *long;* and five, of *short* whist; those gained both by tricks and honours are scored, but tricks count *before honours*, when one party would win the game by the former, and the other by the latter. *Tierce*, or Terce, is a sequence of any three cards, immediately following one another in the same suit. *Tierce-major* is a sequence of ace, king, and queen. *Quart* is a sequence of any four cards, immediately following each other in the same suit. *Quart-major* is a sequence of ace, king, queen, and knave. *Quint* is a sequence of any five cards immediately following one another in the same suit. *Quint-major* is a sequence of ace, king, queen, knave, and ten. *Reverse* means only playing the hand in a different manner; that is, if you are strong in trumps you play one away; if weak in trumps you play the reverse, viz. another. *See-saw* is when each partner trumps a suit, and plays those suits to one another, for that purpose. *Score* is the number of points set up towards the game. *Slam* is when either party wins every trick. *Tenace* is having the first and third best cards, and being last player, consequently catching the adversary when that suit is played; as, for instance, in case you have ace and queen of any suit, your adversary leads, you must win those two tricks; and so on of any other tenace of inferior cards.

WHITE (*hwit: Sax.*), in Chromatics, a colour which is a combination of all the prismatic colours, those natural bodies only appearing white which reflect all the coloured rays.

WHITE BAIT, in Ichthyology, a small fish, greatly esteemed by epicures. It is supposed by some ichthyologists to be a distinct species of the herring genus, and has received from them the name of *clupea alba*, but others believe that white bait is merely the young of the sprat and other allied fishes. It begins to ascend the Thames in the beginning of April, and continues in that part of the river where the water is brackish until September. Its average length is from two to three inches

WHITE-LEAD, a pigment prepared by exposing sheets of lead to the joint action of the vapour of acetic acid, atmospheric air, and carbonic acid; and is a compound of carbonate of lead and oxide of lead. The vapour of the acetic acid merely acts as a carrier between the carbonic acid evolved from some decaying vegetable matter and the oxide of lead. White lead formed by precipitation from a solution is crystalline; and, therefore, not sufficiently opaque for the painter. White lead is often adulterated with sulphate of baryta, which is easily detected by the latter not being soluble in nitric acid.

WHITE-PRECIP'ITATE, in Chemistry, a compound of peroxide and bichloride of mercury with ammonia. It is obtained by precipitating a solution of corrosive sublimate with ammonia, and is a violent poison.

WHITE-PYRI'TES, in Mineralogy, an ore of a white colour, passing into a deep yellow and steel grey, occurring in octahedral crystals, sometimes stalactitical and botryoidal. It consists of sulphur and iron, with small quantities of manganese and silica.

WHI'TESTONE, the *Weiss Stein* of Werner, a granite, a large quantity of white felspar.

WHITE-SWEL'LING, in Medicine, a chronic enlargement of the joints, without any alteration in the colour of the skin; sometimes hard, sometimes yielding to pressure, sometimes indolent, but usually painful; and occurring in those of scrofulous habits.

WHI'TE-THORN, or HAWTHORN, the *Cratægus oxyacantha*, nat. ord. *Pomaceæ.*

WH'ITE-THROAT, the name of two small birds belonging to the Sylviadæ which visit this country in spring. The common white-throat (*Sylvia cinerea*) is much more abundant than the lesser white-throat (*Sylvia curruca*).

WHITE-VIT'RIOL, in Mineralogy, sulphate of zinc. It is found native.

WHI'TEWASH, a composition of lime and water, or of whiting, size, and water, used for whitening the plaster of walls and ceilings.

WHI'TING (*witting: Belg.*), the *Gadus merlangus* of ichthyologists, a small and delicate fish, very abundant along the northern coasts of Europe. It makes its appearance in large shoals, and is taken by the line in great numbers.——*Whiting*, chalk carefully cleared of all strong matter, ground, levigated, and made up into small cakes.

WHIT'LOW, in Surgery, *paronychia*, a swelling or inflammation about the nails or ends of the fingers, generally terminating in an abscess. Whitlows differ very much in their degree of violence, and in their depth and extent; and they are much more common in young healthy persons than in others.

WHIT'SUNTIDE, the seventh Sunday or forty-ninth day after Easter, and properly called *Pentecost*. It is said to have received its popular name from the circumstance that, formerly, those who were baptized that day were dressed in white for the occasion.

WHOOPING COUGH, CHINCOUGH, or KINCOUGH, a convulsive cough, accompanied by a whooping inspiration, and having its paroxysms generally terminated by expectorations of mucus, or vomiting. It is infectious, usually attacks children, and affects the same person but once. It generally begins with slight febrile symptoms, and a common cough, which in about a fortnight becomes spasmodic; it ordinarily lasts for some weeks. When the head is much affected, or it is accompanied by bronchitis, it is dangerous. It is commonly followed by relics, which are best removed by change of air.

WHORTLEBERRY, the fruit of a shrubby alpine plant, belonging to the genus *Vaccinium*, which also includes the cranberry, bilberry, and cowberry plants, nat ord *Vacciniaceæ*.

WICK'LIFFITES, called also *Lollards* [which see], a religious sect which sprung up in England in the reign of Edward III., and took its name from John Wickliffe, doctor and professor of divinity in the university of Oxford; who maintained that the substance of the sacramental bread and wine remained unaltered after consecration; and opposed the doctrine of purgatory, indulgences, auricular confession, the invocation of saints, and the worship of images He made an English version of the Bible; and composed two volumes called *Aletheia*, that is Truth: from which John Huss learned most of his doctrines. They were the precursors of the reformation, which took place about two hundred years after.

WIG'WAM, a name given by the English to the huts or cabins of the North American Indians.

WILL (*willa: Sax*), that faculty of the mind by which we determine either to do or forbear an action. The will is directed or influenced by the judgment. The understanding or reason compares different objects, which operate as motives, the judgment determines which is preferable; and the *will* decides which to pursue.

WILL or TES'TAMENT, the disposition of a person's estate, to take effect after his or her decease. All wills made in England must be in *writing*, and each must be signed at the bottom or end by the testator, or, if he is unable, by some person by his direction, and in his presence; and two or more attesting witnesses (who must be present at the same time), must also sign the will in the presence of the testator. If the latter wishes to acknowledge or reward the attesting witnesses he must do it in some other way than by bequeathing them anything; for legacies to attesting witnesses, or to the wife or husband of an attesting witness, are void. The wills of soldiers and seamen, including officers, if regarding *personal estate*, need not be in writing. No person under twenty-one can make a valid will. Wills are revoked by subsequent marriage, by destruction, or by the making of a new one; and alterations in wills must be made in the same manner as a will. Wills are to be construed as if made immediately before the death of the testator, unless a contrary intention is expressed; and properties bequeathed in general terms include all property in the possession of the testator at his decease, whether acquired before or after the will was made. A married woman cannot make a will except as regards settled estate, and under a power given to her by the settlement *Codicils* are additions to a will, and require to be executed like a will.

WIL'LOW (*welig: A.-Sax.*), the name of trees belonging to the genus *Salix*, of which we have several species in Britain. Their twigs are employed under the name of osiers in basket making ——The *weeping willow*, *Salix Babylonica*, has long and slender branches, which droop and hang downward in graceful tresses. The willow was, in ancient days, especially among herdsmen and rustics, *a badge of mourning*, as may be collected from Virgil, in his Eclogues, where the nymphs and herdsmen are frequently introduced, sitting under a willow mourning their loves. The same occurs in many Greek poets For the ancients frequently selected, and, as it were, appropriated several trees, as indexes or testimonials of the various passions of mankind The Jews, upon their being led into captivity (Ps. cxxxvii), are said to hang their harps upon *willows*, *i e* trees appropriated to men in affliction and sorrow, who had lost their beloved Sion

WIL'LOW-HERB, the common name of plants belonging to the genus *Epilobium* Several species are wild in Britain, and others are cultivated in gardens, but none are of any use.

WINCHESTER BUSHEL, the original English standard measure of capacity given by King Edgar, and kept in the town-hall of the ancient city of Winchester, with other measures both of quantity and length Until the year 1826, when the imperial standard measure was introduced, the Winchester bushel was the standard for England.

WIND, a motion or sensible current of the air. As it is a fluid, the natural state of air is rest, which it always endeavours to preserve, and if disturbed to recover. When, therefore, this equilibrium is destroyed by rarefaction in particular places, the weightier air will rush in to restore it; the resulting currents being often deflected by mountains and crossed by other currents. The different degrees of rarefaction by day, and condensation by night, keep the air in a state of constant activity The rare superior parts appear, however, to be more affected than the lower stratum, balloons having been carried upwards of sixty miles an hour, at the height of two miles, while the moderate wind below has not moved more than fifteen miles. In different countries the direction of the winds differs considerably, according to the situation of the places where the observations have been made. In Great Britain the south-west is by far the most frequent wind. In April, May, and part of June, the east wind is common, especially on the east coast of the island. In Ireland the south-west and west are the most prevalent. On the south coast of Europe the most frequent winds are the north, the north-east, and the north-west; and on the western coast the north-west prevails. [See TRADE WINDS, ATMOSPHERE, &c.]

WIND'AGE, the difference between the bore of a gun and the diameter of the ball; it has been latterly much diminished, the result of which is that the ball will go much more truly, and less powder is required. It was formerly one-twentieth of the diameter of the bore.

WIND'BOUND, an epithet for a ship that cannot leave the port on account of unfavourable winds.

WIND'LASS (*windam*, to turn round: *Sax.*), a common mechanical contrivance, by which weights are raised, water drawn out of a well, &c. Since the momentum is in proportion to velocity, and the hand at the winch makes a larger circle than the cylinder round which the rope coils, the power is rendered very effective by this machine. For, if the hand describes a circle of six feet, while the bucket, &c. moves through but one foot, the power of the hand, friction not being taken into account, is capable of overcoming six times its amount at the bucket, &c.

WIND'MILL, a machine erected in elevated positions, and provided with vanes or sails, which are so placed as to be turned by the wind. In order that the wind may regulate the position of the mill, a vane is placed on the side which is opposite the sails, and by a simple mechanism turns them always to the wind. When the mill is not too large it is either turned round on a vertical axis, with a lever, or the roof alone with the axle and wings is moved. In the former case it is called a German mill, in the latter a Dutch mill. On account of the inconstant nature of the wind, it is necessary to have some provision for accommodating the resistance of the sails to the degree of violence with which the wind blows. This is generally done by clothing and unclothing them; that is, by covering, with canvass or thin boards, a greater or smaller portion of the frame of the sails, according to the force of the wind at different times. A method has been devised for producing the same effect, by altering the obliquity of the sails; and windmills have been so made as to regulate their own adjustment. A horizontal arrangement of the sails has been frequently tried, but it has never been found to answer. The moving force being very irregular and entirely interrupted in calm weather, windmills are applicable only in particular cases; they are used in Holland very advantageously for drainage. The angle which the sails should make with the plane of the arms has been the subject of much investigation.

WINE, a liquor drawn from vegetable bodies, and fermented; but more especially, the fermented juice of the fruit of the vine. *Wine* differs essentially from *spirit*, the former being only *fermented*, and the latter also *distilled*. From the definition here given, it will be evident that ale, cider, and other vegetable fermented liquors, are properly wines; though the term is, by custom, confined to liquors drawn from the grape. Wines are divided into two principal classes; *red* and *white*. *White wines* are of an amber colour, more or less deep; but so called to distinguish them from the *red* wines. The generality of white wines are made from white grapes; but some are from black ones, the skins of which are carefully kept from imparting their colour. On a chemical investigation, all wines consist chiefly of water and alcohol, besides some vegetable acid, the carbonic acid, tartar, and an astringent gum-resinous matter, in which the colour of the red wine resides, and which is expressed from the husks of the grape. They differ from each other in the proportion they contain of these ingredients, and particularly of the alcohol; some of the latter, called *vinage*, is added, in many districts, to render the wine capable of removal for exportation. In a very hot country the grape becomes too saccharine; in one that is too cold it does not ripen sufficiently. The seeds of the grape, which contain tannin and extractive matter, modify the taste of wine; they are added in making port wine, but generally are excluded from the wines of Bordeaux and the Rhine. The *aroma* of wine is often factitious, being produced by aromatic herbs, &c. When it can be relied on, however, it is a test of excellence; it is distinct from *flavour*. The quality of wine depends very much upon the circumstances attending the process of fermentation. The general effects of wine are, to stimulate the stomach, exhilarate the spirits, quicken the circulation, promote perspiration, and, when taken in large quantities, to prove intoxicating, and powerfully sedative. Among the Greeks and Romans, the sweet wines were those most commonly in use; and, in preparing their wines, the ancients often inspissated them until they became of the consistency of honey, or even thicker. They were diluted with water previously to being drunk; and indeed, the habit of mixing wine with water seems to have prevailed much more in antiquity than in modern times. In 1865 we imported 2,204,580 gals. of wine, of which about one-half came from Spain, one-fifth from Portugal, and one-sixth from France.

WING (*gehwing: Sax.*), the limb of a bird admirably constructed and covered with feathers for the purpose of aerial locomotion. The different bones of the wing are bound together, and connected with the bones of the body by strong ligaments; and the muscles by which motion is communicated to them are the most powerful with which a bird is provided.——The wings of insects are highly varied, often very beautiful, and so important that their different characteristics give rise to the division of insects into Coleoptera, Hymenoptera, Diptera, Neuroptera, &c. [see these terms]. ——*Wing*, in Architecture, a side building, less than the main edifice. In Botany, the side petal of a papilionaceous corolla. ——*Wings*, in Fortification, the longer sides of horn-works, crown-works, tenailles, and other outworks; including the ramparts and parapets, with which they are bounded on the right and left from their gorge to their front.——*Wings*, in Military affairs, the two flanks or extremes of an army, ranged in order of battle.——In Naval constructions, passages along the sides of the ship, between the fore and after cockpit.

WING'ED, in Botany, a term applied to such stems of plants as are furnished with a prolongation of the leaves in the shape of a wing; as in some of the thistles. *Winged leaves* are such as consist of several little leaves ranged in the same direction, so as to appear only as the same leaf. Such are the leaves of agrimony, acacia, ash, &c. *Winged seeds* are such as have down or hairs, called *pappus* by botanists, by means of which the wind carries them to a distance.

WIN'TER (*Ang.-Sax.*), one of the four seasons of the year; commencing on the day when the sun's distance from the zenith of the place is the greatest, and ending on that when it is at a mean between the greatest and the least. The sun is nearer to the earth in winter than in summer; the coldness of winter is therefore owing to the shortness of the days or time during which the sun is above the horizon; and the oblique direction in which his rays fall upon our part of the globe at that season.

WINTER-CHERRY, a plant of the genus *Physalis*, and its fruit, which is of the size of a cherry. It is sometimes called the Cape gooseberry.

WI'RE-DRAWING, a very curious art, by which with the aid of steam, water, or some other power, wire is drawn through orifices successively smaller. Wire may thus be reduced from an inch to the 1000th of an inch in diameter, and gold has been made the 4000th of an inch in diameter. A single grain of gold admits of being drawn out easily into a wire 100 yards long. That property of metals by which they submit to this operation without breaking is called their *ductility*, which see.

WI'RE-WORM, the larva of a beetle belonging to the genus *Elater*, which is very destructive to wheat. It is computed that the crops on 60,000 acres are annually destroyed by this insect in Great Britain.

WIS'DOM OF SOLOMON, one of the books of the Apocrypha. It is by many thought to have been written after the cabalistic philosophy was introduced among the Jews.

WIT (*witam*, to know: *Sax.*), in its original signification, was synonymous with wisdom. Thus we read of our ancient wittenagemot, or Saxon parliament, an assembly of wise men; and so late as the Elizabethan age, a man of great or pregnant wit meant a man of vast judgment. The word wit, however, like many others, has in the course of time undergone various mutations. According to Locke, wit lies in the assemblage of ideas, and putting those together with quickness and variety, so that a congruity of associations and pleasant images may be present to the fancy; while Pope defines it to be a quick conception and an easy delivery. It is evident that wit excites in the mind an agreeable surprise; and that this is entirely owing to the strange assemblage of congruous ideas presented to the mind. Of so much consequence are surprise and novelty, that nothing is more vapid than a joke that has become stale by frequent repetition. For the same reason a witty repartee is infinitely more pleasing than a witty attack; and a pun or happy allusion thrown out extempore, in conversation, will often appear excellent, though it might be deemed execrable in print. As a learned divine has well observed: 'Sometimes it playeth in words and phrases, taking advantage from the ambiguity of their sense, or the affinity of their sound; sometimes it is wrapped in a dress of humorous expression; sometimes it lurketh under an odd similitude; sometimes it is lodged in a sly question, in a smart answer, in a quirkish reason, in a shrewd intimation, in cunningly diverting or cleverly retorting an objection; sometimes it is couched in a bold scheme of speech, in a tart irony, in a lusty hyperbole, in a startling metaphor, in a plausible reconciling of contradictions, or in acute nonsense. Often it consisteth in one knows not what, and springeth up one can hardly tell how.'

WITCH'CRAFT (*wicce*, a witch: *Sax.*), a supernatural power, which persons were formerly supposed to obtain by entering into compact with the evil one. It was believed that they gave themselves up to him body and soul; and he engaged that they should want for nothing, and should be able to assume whatever shape they pleased, to visit and torment their enemies! A belief in witchcraft was prevalent among the Greeks and Romans; but it was founded on incantations and magical practices. There is only one particular narrative of a witch, in the Old Testament, the evocation of Samuel by the witch of Endor. Witchcraft was universally believed in throughout Europe till the 16th century; and it even maintained its ground with tolerable firmness till the 17th. Vast numbers of reputed witches were convicted and condemned to be burnt. It is recorded that 500 witches were burnt at Geneva in three months, about the year 1515; that 1000 were executed in one year in the diocese of Como; and it has been calculated that not less than 100,000 victims must have suffered, in Germany alone, from the date of Innocent's bull, in 1484, which directed the Inquisition to be vigilant in searching out and punishing witches, to the final extinction of such prosecutions. The number of those put to death in England has been estimated at about 30,000.

WITENAG'EMOTE (an assembly of wise men: *Sax.*), the great national council of the Anglo-Saxon kings. It consisted of bishops, abbots, earls, aldermen, thanes of

Danish burghs, and, it is supposed, of all who possessed forty hides of land.

WITH'ERITE, in Mineralogy, a carbonate of barytes. It is grey, white, or yellow.

WITNESS, in Law, one who gives evidence in legal investigations. In civil cases, witnesses are compelled to appear by *subpœna* [which see]; and if they neglect to attend are punishable by attachment or action. In criminal cases, by *subpœna* or *recognizance*, taken by the magistrate before whom the information is given. Persons are incompetent according to law to give evidence in a court of justice if they want reason, or do not believe in the existence of a God and the rewards and punishments of a future state.

WOAD (*wad: Sax.*), a cruciferous plant of the genus *Isatis*, from which is extracted a drug that imparts a blue colour, and is much used by dyers. It springs from seeds annually sown in the spring; and is grown in France and on the coasts of the Baltic. ——The ancient Britons are said to have painted their bodies with the dye procured from this plant.

WODEN, an Anglo-Saxon deity supposed to correspond with Mercury, and erroneously believed by some to be the same as Odin. He has given its name to Wednesday.

WOLF (*walf: Sax*), the *Canis lupus*, a ferocious quadruped, in habits and physical development closely allied to the dog. It is very destructive to sheep; and, when pressed with hunger, will enter houses and even devour children. The wolf was at one time a native of this country, and all possible means were adopted to rid it of so rapacious a despoiler. King Edgar attempted to effect this, in England, by remitting the punishment of certain crimes on producing a certain number of wolves' tongues; and in Wales, the tax of gold and silver was commuted for an annual tribute of their heads. They were so numerous in Scotland, about the middle of the 15th century, that they completely overran the country, to the destruction of the flocks; nor were they, with every exertion of the natives, totally extirpated till the year 1680, when the last wolf is recorded to have fallen by the hand of the famous Sir Ewen Cameron.

WOLF'-FISH, the *Anarrhicas lupus* of ichthyologists, a fierce and voracious fish of the northern seas; sometimes taken on our coasts, and attaining to the length of six feet. It has a cat-like face, and its teeth are strong and pointed.

WOL'FRAM, in Mineralogy, is the native tungstate of iron and manganese, which occurs in primitive formations, along with the ores of tin, antimony, and lead, in North America, Bohemia, Switzerland, Cornwall, &c. Tungsten, which is sometimes termed wolframium, and tungstic acid, are obtained from it.

WOL'VERENE. [See GLUTTON.]

WOM'AN, the female of the human race, grown to an adult age. Among the Greeks and Romans, women were employed in spinning, weaving, embroidery, and all sorts of needle-work; their education being wholly confined to their domestic duties. 'In every age and country (says Gibbon), the wiser, or at least the stronger, of the two sexes has usurped the powers of the state, and confined the other to the cares and pleasures of domestic life. In hereditary monarchies, however, and especially in those of modern Europe, the gallant spirit of chivalry, and the law of succession, have accustomed us to allow a singular exception; and a woman is often acknowledged the absolute sovereign of a great kingdom, in which she would be deemed incapable of exercising the smallest employment, civil or military. But as the Roman emperors were still considered as the generals and magistrates of the republic, their wives, although distinguished by the name of Augusta, were never associated to their personal honours; and a female reign would have appeared an inexpiable prodigy in the eyes of those primitive Romans who married without love, or loved without delicacy and respect.' In our treatment of the sex there is a just medium to be observed—as far removed from their humiliation as it is from that extravagant homage which stops at nothing short of their deification. Woman is the equal and companion of man—not the plaything of his caprice, nor the slave of his passions.

WON'DER, that emotion which is excited by something presented to the senses which is either sudden, extraordinary, or not well understood. The word *wonder* is nearly allied to *astonishment*, though it expresses less, and much less than *amazement*.——Among the Ancients, *the seven wonders of the world* were—the Egyptian pyramids—the mausoleum erected by Artemisia—the temple of Diana at Ephesus—the walls and hanging gardens of Babylon—the colossus at Rhodes—the statue of Jupiter Olympus—and the Pharos or watch-tower at Alexandria.

WOOD (*wude: Sax.*), in Plants, the support of all the deciduous organs of aeration, assimilation, and fructification; the deposit of the secretions peculiar to the individual species; the reservoirs whence the newly formed parts derive their sustenance, until they can establish a communication with the soil. It consists of *woody tissue*, and various kinds of vessels surrounded by *cellular matter*. While young it is succulent and brittle, and nearly the same in all plants, but it becomes hard as it grows old, by the addition of secondary deposits within the woody tissue. While young it is called *sapwood* or *alburnum;* when hardened and coloured, it is *heartwood* or *duramen*. It contains a large quantity of nitrogen, which causes it to be perishable, but which may be removed by washing; and its azotized matter is believed to be rendered insoluble by certain preservative agents. The concentric circles of the wood determine the age of the tree.

WOOD'COCK, the *Scolopax rusticola*, a bird allied to the snipe, much prized by epicures, inhabiting the northern parts of the European continent in summer, but frequenting England in winter.

WOOD-ENGRAVING, or wood-cutting, the art of cutting figures in wood, that they may be printed by the same process as common letter-press. The mode of engraving on wood is exactly the reverse of that of copper-plate, the parts intended to appear being raised on the surface. The wood which is used for the purpose of engraving is that of the box-tree, of which a considerable quantity is imported from Turkey. The design drawn upon the wood is the reverse of the object copied, so that when the impression is taken from the engraving the object is correctly represented. [See ENGRAVING.]

WOOD'-GELD, in our ancient customs, the gathering or cutting of wood within the forest; or the money paid for the same to the foresters. Sometimes it also seems to signify an immunity from this payment by the king's grant.

WOOD'PECKER, a name given to some scansorial birds forming the genus *Picus* of ornithologists. Four species are known in Britain, of which the green woodpecker, *Picus viridis*, is the commonest. They climb trees in search of larvæ, and are able to ascend a trunk with facility by means of their strong claws, and the support derived from propping themselves with their tail feathers.

WOOD'-PIGEON, or RING DOVE, the *Columba palumbus* of ornithologists. [See PIGEON.]

WOODY FIBRE. [See LIGNINE.]

WOOF, the cross threads in weaving, introduced by the shuttle, when part of the warp is raised.

WOOL (*wul: A.-Sax.*), the fleecy coat of the sheep, which in fineness sometimes approaches fur. Wool, like the hair of horses, cattle, and most animals, completes its growth in a year, then falls off as hair does, and is succeeded by a fresh crop. It differs from hair, however, in the uniformity of its growth and the regularity of its shedding. Hairs are commonly of the same thickness in every part; but wool constantly varies in thickness in different parts, being generally thicker at the points than at the roots. While the wool yet remains in the state it was first shorn off the sheep's back, and before being sorted into its different kinds, it is called a *fleece*. The wool of the same animal differs much on the various parts of the body, that on the back and the sides being the best. The great difference in the wool of different sheep depends, in general, upon their descent, the crossing of breeds, climate, food, age, and manner of living. Some of the most scientific 'wool-growers' maintain, that the degree of softness (the most valuable quality in wool) depends principally on the nature of the soil on which sheep are fed; that sheep pastured on chalky districts, or light calcareous soil, usually produce hard wool; while the wool of those that are pastured on rich, loamy, argillaceous soils, is always distinguished by its superior softness. Wool, either in a raw or a manufactured state, has always been the principal of the staple articles of this country. Before the time of Edward III. it was always exported raw, the art of working it into cloth and dyeing being so imperfectly known that no persons above the degree of working people would dress in cloth of English manufacture. The first step taken to encourage the manufacture of woollen cloths was by Edward III., who procured some good workmen from the Netherlands, by means of protection and encouragement. The value of wool was considered so essentially solid, that taxes were vested in that commodity, reckoning by the number of sacks; and in proportion to the price of the necessaries of life, and value of silver, wool was at least three times dearer than it is now. By an act of Henry IV. c. 2, the exportation of sheep, lambs, or rams was forbidden, under very heavy penalties. From 1660 down to 1825 the export of wool was strictly prohibited, but in the latter year the prohibition was removed. Wool in the state in which it is taken from the sheep is always mixed with much dirt and foulness of different kinds; and, in particular, is imbued with a peculiar potash soap, secreted in large quantity by the animal. These impurities are got rid of by washing, fulling, and combing, by which the wool is rendered remarkably white, soft, clean, light, and springy under the hand. When boiled in water for several hours, in a common vessel, wool is not in any way altered in weight and texture, nor does the water acquire any sensible impregnation The filaments of the finer wool vary from the one-thousandth to the one-fifteen hundredth of an inch in thickness; each filament of wool consists of a series of serrated rings. [See FELTING.] Besides the wool produced in this country, 209,394,249lbs. were imported in 1865, of which rather more than one-half came from Australia, and rather more than one-eighth from our South African colonies.

WOOL'LEN MAN'UFACTURE. There are two sorts of wool which afford the basis of different fabrics, the *long* wool, in which the fibres are rendered parallel by the process of combing; and the *short* wool, prepared by carding, like cotton, which is used in different degrees of fineness, for broad-cloths, flannels, &c. The wool of which good broad-cloth is made should be not only shorter, but, generally speaking, finer and softer than the worsted wools, in order to fit them for the fulling process. The best English short native fleeces, such as the fine Norfolk and Southdown, are generally divided by the wool-sorter into several kinds: all varying in fineness. When the wool is dyed, the cloth is said to be *wool dyed;* but when the cloth itself is dyed, it is said to be *piece dyed.* In cloths made of short wool, the web, when taken from the loom, is loose and open, and requires to be submitted to the operation of *fulling*, by which the fibres are made to *felt*, and combine more closely. By this process the cloth is reduced in its dimensions, and the beauty and stability of the texture are greatly improved. The nap or downy surface of broad-cloths is raised by a process which, while it improves the beauty, tends somewhat to diminish the strength of the texture. It is produced by carding the cloth with heads of teasel (*Dipsacus fullonum*), a plant cultivated for the purpose. This operation extricates a part of the fibres, and lays them in a parallel direction. The nap, composed of these fibres, is then cut off to an even surface, by the process of *shearing*. This is performed in various ways; but, in one of the most common methods, a large spiral blade revolves rapidly in contact with another blade, while the cloth is stretched over a bed, or support, just near enough for the projecting filaments to be cut off at a uniform length, while the main texture remains uninjured. *Pressing* finishes the cloth, and gives it a smooth level surface. The piece is folded backwards and forwards in yard lengths, so as to form a thick package on the board of a screw or hydraulic press. Between every fold sheets of glazed paper are placed, to prevent the contiguous surfaces of cloth from coming into contact; and with the assistance of hot iron plates, carefully arranged, and severe compression, the cloth receives a smooth and glossy appearance. The value of the manufactured wool, imported into this country, in 1865, amounted to 1,704,758*l*., but this did not include 4,392,090lbs. of woollen and worsted yarn. The total declared value of woollen and worsted manufactures exported from the United Kingdom in 1865 was 20,102,259*l*.

WOOL'SACK, a name for the seat of the lord chancellor in the House of Lords. It is so called, from being a large square bag of wool, without back or arms, covered with red cloth; it was adopted as a mark of the importance of our woollen manufacture. When, in the reign of Elizabeth, an Act of Parliament was passed to prevent the exportation of wool, to keep in mind this source of our national wealth, wool sacks were placed in the House of Lords for the lord chancellors, judges, and sergeants.

WOOTZ, steel imported from Bengal; it is excellent for cutting instruments, and is believed to contain minute portions of silica and alumina.

WORDS are signs, or symbols of ideas and thoughts, produced by sounds, and combinations of sounds, or by letters and their combinations. [See LANGUAGE.]

WORM (*wyrm: Sax.*), in a popular sense, any small cylindrical animal, or reptile, including a great variety of different classes and orders.——*Worm*, in Laboratories and Distilleries, a spiral pipe almost always of metal, placed in a vessel of water. The vapour formed during the process of distillation, being transmitted through it, is cooled and condensed. As the water by which it is surrounded becomes hot it ascends and flows away, its place being supplied by a fresh portion, which enters below.——In Gunnery, a screw of iron, which may be fixed on the end of a rammer, to pull out the wad of a cannon, firelock, or pistol.

WORM'ING, an operation performed on puppies, under an ignorant supposition that it prevents them going mad; but in reality to cure them, as it generally does, of the disposition to knaw everything in their way. It consists in the removal of a small worm-like ligament, situated beneath the tongue; and the part being afterwards sore for some days, the animal is thus weaned of his mischievous habits.

WORM'WOOD, a small composite shrub, the *Artemisia absinthium* of botanists, formerly used in medicine as a tonic and anthelmintic. The seed is employed by the rectifiers of British spirits, and the plant is a good deal cultivated in certain parts of England for that purpose.

WOR'STED (*Worsted*, a town in Norfolk, famous for the woollen manufacture), a kind of thread or yarn spun of wool that has been combed, and which, in the spinning, is twisted harder than ordinary. It is chiefly used either to be knit or woven into stockings, caps, &c.

WOULFE'S APPARA'TUS, a very useful apparatus for chemical purposes, consisting essentially of one or more bottles, each having two or three necks; and is used for impregnating water and other fluids with vapours and gases. Before it was known, the only vessels that chemists employed for distillations were either the alembic with its refrigeratory, or the retort with its receiver. The former was devoted almost exclusively to the distillation of those fluids which are readily condensed by cooling, and are not attended with the production of much permanently elastic vapour, or such as was not easily condensable: thus, water impregnated with the aromatic parts of vegetables, alcohol, &c.; whilst the retort, with its glass receiver, was reserved for the distillation of the stronger acids, and other substances accompanied by much uncondensable vapour. In experiments of research, the old apparatus was peculiarly defective, as the gaseous products, which are often by far the most interesting, were entirely lost. When Woulfe's apparatus is employed, a retort or other vessel, for heating the materials, is connected by means of a bent tube with one of Woulfe's bottles. If more than one of these bottles are required they are ranged side by side, and are connected with each other by tubes, each of which proceeds from the upper part of one bottle to the bottom of the liquid in the next, the centre neck of each bottle, if it have three necks, being closed either with a solid cork, and if necessary luted, or with a cork in which is inserted a *safety-tube*, that passes down through it, and dips in the liquid at the bottom. This tube allows the elastic fluid, if generated in too large quantity, to escape into the atmosphere; while, in ordinary circumstances, as it dips into a liquid, they are unable to pass off. Every part of the apparatus is air-tight, except the extremity farthest from the retort, so that every particle of vapour or gas has to traverse the whole series of vessels, and to pass through the liquid in every one of the bottles, before it escapes into the air; and thus, if at all condensable by the liquid used, can hardly escape condensation. The apparatus was not altogether unknown, even before Woulfe's time

WOU'RALI PORSON. [See URALI.]

WRACK, in Botany, the *Fucus vesiculosus*, a marine plant which is of great utility as a manure. It is found on rocks left dry at low water; the stalk runs along the middle of the leaf, and is terminated by watery bladders. It is sometimes called *sea-oak* and *sea-tangle*.

WRAN'GLER, SENIOR, in the university of Cambridge, the student who passes the best examination (especially in mathematics) in the senate-house, for the first degree, or that of bachelor in arts; they who follow next in the same division are respectively termed *second*, *third*, *fourth*, &c., *wranglers*. The students belonging to the next two classes are termed senior, and junior *optimes*, respectively; and the fourth or lowest class consists of the *hoi polloi* (the many).

WRASS, or **WRASSE**, a name given to marine fishes belonging to the spiny finned genus *Labrus*.

WRECK (*wracke: Belg.*), in Navigation, the destruction of a ship, by being driven ashore. Also, a vessel found floating at sea in a deserted and unmanageable condition. But in order to constitute a legal wreck, the goods must come to land. In former times the most inhospitable and barbarous conduct was exercised against all who had the misfortune to suffer from the perils of the sea; but as commerce and navigation were extended, the law was made to afford the adventurous mariner protection. In England, as in other countries, wrecks had been adjudged to the king; but the rigour and injustice of this law was modified so early as the reign of Henry I.; when it was ruled, that if any person escaped alive out of the ship, it should be no wreck. And after various modifications, it was decided, in the reign of Henry III., that if goods were cast on shore, having any marks by which they could be identified, they were to revert to the owners, if claimed any time within a year and a day. The plundering of wrecks had, however, become so confirmed by the custom of ages, that various subsequent penal statutes were enacted to repress it; even so lately as the reign of George II. it was found necessary to pass a new statute for the purpose; and by a statute of George IV., plundering wrecked vessels or goods stranded is felony; goods cast overboard and not stranded are divided into *jetsam*, or those sunk to the bottom; *flotsam*, or things found floating; and *ligsam*, or things sunk, but attached to a buoy or cork, that they may be found again; all these belong to the crown if no owner appears to claim them. Insurance against loss by wreck is effected with persons called underwriters, who chiefly exercise their calling at Lloyd's, in the Royal Exchange, London.

WREN (*wrenna: Ang.-Sax.*), the name of small birds belonging to the genus *Troglodytes*. The common wren (*T. vulgaris*) is the chesnut coloured, with the wings variegated with white and grey. This is a minute bird, and, except the golden-crowned wren, the smallest of any in Europe; the head is large and round, the eyes dark, and the beak slender and brown; the tail is short, and generally carried erect; the head, neck, and back, are of a dusky chesnut-brown; the breast is of a dusky white, and the lower part of it is variegated with obscure and transverse lines of black. It is fond of prying about crevices and holes in walls, and is constantly in motion, searching for insects, which form its principal food.——The *golden-crowned wren* is distinguished by an orange crown; its length is 4½ inches, and its weight under 80 grains. It builds its nest, which is remarkably neat, on the oak, yew, or some species of the pine. This is most commonly open at the top, but sometimes covered with a dome, and it has an opening on one side. It is always ingeniously suspended beneath the branch, like those of many tropical birds, being the only instance of the kind amongst those of Great Britain. The eggs are about ten in number, and are small, round, and white. In a still and sultry noon, when not a leaf is stirring, and almost every other bird has retired from the heat of the sun into the shadiest thickets, the little solitary golden-crowned wren is to be seen flitting noiselessly from spray to spray, in search of its food, paying no attention to any one who happens to be watching it; and never for a moment remaining in a state of rest. The lightness and airiness of its motions, as it hops and flutters about upon the smallest twigs, are unrivalled; and in shape and plumage it is also superior to most of the feathered inhabitants of our groves and gardens. Its song is very soft and low—a mere whisper—and therefore quite in keeping with its tiny and delicate form.

WREST'LING (*wræstan*, to twist by violence: *Sax.*), a kind of combat or engagement between two persons unarmed, body to body, to prove their strength and dexterity, and try which can throw his opponent on the ground. Wrestling is an exercise of very great antiquity and fame. It was in use in the heroic age; and had considerable rewards and honours assigned to it at the Olympic games. The wrestlers of Cornwall and Devon in the south-west, and Cumberland and Westmorland in the north-west, seem to have always been most celebrated among the English athletæ.

WRIST (*wyrst: Sax.*), in Anatomy, the *Carpus*, that joint by which the hand is united to the arm. It is composed of eight small bones in two rows, the motions of which on the fore-arm may be described as those of flexion, extension, abduction, and circumduction.——In the manege the *bridle wrist* is that of the left-hand. A horseman's wrist and his elbow should be equally raised; and the wrist should be two or three fingers above the pommel of the saddle.

WRIT, in Law, a precept in writing, under seal, issued by some court or magistrate in the name of the government, and addressed to a sheriff, his deputy, or other subordinate executive officer, commanding him to do some particular thing. Writs have been much reduced in number; the *original* writ, issuing out of chancery, for the commencement of actions in the three courts of common law, is now superseded by three *judicial* writs, which issue in the name of the chief justice of the respective courts; these are the writ of *summons*, the writ of *capias ad respondendum*, and the writ of *detainer*. The first is ordinarily used; the second only when it is intended to arrest the defendant; and the third, when he is already in prison for some other cause. A writ, or summons, is called a *subpœna*, when it requires witnesses to appear to give evidence of *habeas corpus*, when it is to bring up the body; of *premunire*, when it incurs forfeiture of all property; and of *qui tam*, when to recover a fine, of which the prosecutor is to have a share. These and others will be found in their respective places in this work.

WRITER *to the Signet*, a numerous society of lawyers, in Scotland, equivalent to the class of attorneys and solicitors in England.——*Writer of the Tallies*, formerly an officer of the English exchequer; a clerk to the auditor of the receipt, who wrote upon the tallies the whole of the tellers' bills. [See TALLIES.]

WRI'TING (*writan*, to write: *Sax.*), the art and act of expressing ideas by letters or characters visible to the eye. Without its aid the experience of each generation would have been almost entirely lost to succeeding ages, and only a faint glimmer of truth could have been discerned through the mists of tradition. The most ancient remains of writing, which have been transmitted to us, are upon hard substances, such as stones and metals, which were used for edicts and matters of public notoriety. Thus we read that the decalogue was written on two tables of stone; but this practice was not peculiar to the Jews, for it was used by most of the Eastern nations as well as by the Greeks and Romans. The laws, penal, civil, and ceremonial, among the Greeks were graven on tables of brass, called *kurbeis*. The Chinese, before the invention of paper, wrote or engraved with an iron tool, or style, upon thin boards or on bamboo. Pliny says, that table-books of wood were in use before the time of Homer; afterwards these were usually waxed over, and written upon with a style the writing was then easily effaced, and by smoothing the wax, new matter might be substituted in the place of what was written before. The bark of trees was also used for writing by the ancients, and is so still in several parts of Asia. The same may be said of the leaves of trees. But the Greeks and Romans continued the use of waxed table-books long after the use of papyrus, leaves, and skins became common, because they were so convenient for correcting extemporary compositions. [See PAPER, PAPYRUS, &c.]——Where writings have been effaced for fraudulent purposes with muriatic acid, sulphuret of ammonia and prussiate of potash will revive them. Very old writing may be revived in this way. If indigo and oxide of manganese be added to common ink, it will prevent its being effaced by muriatic acid.

WRYNECK. [See YUNX.]

WYV'ERN, in Heraldry, a kind of flying serpent, an imaginary animal, occasionally represented in coats of arms.

X

X, the twenty-fourth letter of the English alphabet, is borrowed from the Greek. When used at the beginning of a word, it has precisely the sound of *z*; but in the middle and at the end of words, its sound is the same as *ks*—as *wax*, *luxury*, *taxation*, &c. In French it is variously pronounced. It is not found in Italian, its place being supplied by *ss*, as in *Alessandro;* the Germans generally substitute for it *ks*, *gs*, or *chs*, and never use it in the beginning of a word. It begins no word in our language but such as are of Greek original, and is found in few others besides those which are of Latin derivation. As a numeral, X stands for ten. When laid horizontally, thus ⋈, it stands for a thousand, and with a dash over it, ten thousand. As an abbreviation, X stands for *Christ*, as in Xn, *Christian;* Xmas, *Christmas*.

XAN'THIAN MARBLES, a collection of sculptures in the British Museum, obtained chiefly from Xanthus in Lycia, Asia Minor. They range in date from the subjugation of the country by the Persians, B.C. 545, to the period of the Byzantine Empire. They were discovered by Sir C. Fellows, and brought to this country by two expeditions, sent out by the government in 1842-46.

XAN'THIC OXIDE (*xanthos*, yellow: *Gr.*), in Chemistry, a very rare species of urinary *calculus*, of a reddish or yellow colour, soluble both in acids and alkalis; and its solution in nitric acid, when evaporated, possesses a brilliant yellow tint: hence its name. It is composed of carbon, hydrogen, nitrogen, and oxygen.

XAN'THINE (same *deriv.*), the yellow colouring principle of madder.

XAN'THITE (same *deriv.*), a mineral found in small grains and crystals of a yellow colour, near New York; its principal constituents are silicate of lime and silicate of alumina.

XAN'THIUM (*xanthion*, from *same: Gr.*), in Botany, a genus of composite plants containing the *Lesser Burdock*, the *Xanthium Strumarium* of botanists. It was once esteemed for cases of scrofula, but, like most other remedies against this disease, proves ineffectual. It is sometimes used as a yellow dye; hence its name.

XAN'THOGEN (*xanthos*, yellow; and *gennao*, I produce: *Gr.*), in Chemistry, the base of an acid, obtained in combination with potash by the mixture of a solution of pure potassa with bisulphuret of carbon. It contains sulphur, carbon, and hydrogen, and obtained its name from the yellow colour of its compounds.

XANTHOX'YLUM (*xanthos*, yellow; and *xulon*, wood: *Gr.*—from its yellow hue), in Botany, a genus of trees growing in Asia and America, and including the Toothache-tree, so called from its supposed virtue in pains of the teeth. It belongs to the nat. ord. *Xanthoxylaceæ*, and is a native of America.

XEBEC', a small three-masted vessel, used in the Mediterranean Sea, and on the coasts of Spain, Portugal, and Barbary. Having been usually equipped as a corsair, the xebec is constructed with the *floor*, or part which touches the earth when it is aground, narrow, for the sake of speed; and of a great breadth, so as to be able to carry a considerable force of sail without danger of overturning. When close-hauled, it carries large lateen sails. The Algerine xebecs were usually equipped with from 16 to 24 guns, and from 300 to 450 men, two-thirds of whom were soldiers.

XENELA'SIA (*xenos*, a stranger; and *elausio*, I drive away: *Gr.*), in Antiquity, a law among the Spartans, by which strangers were excluded from their society; not out of fear lest they should imitate the Spartan manners, but lest the Spartans should be contaminated by foreign vices. It was a barrier set up against contagion; but was not so strict as to prevent deserving persons, or men of talent, from being received.

XE'NIA (*Gr.*; from *xenos*, a stranger), among the Greeks and Romans, presents made by strangers to such as had treated them with kindness and hospitality. *Xenia* was also a name given to the gifts and presents made to the governors of provinces by the inhabitants.

XERA'SIA (*xērasia*, from *xēros*, dry: *Gr.*), in Medicine, an excessive tenuity of the hairs. It is common among animals which are badly fed: the hairs resemble down and fall off through dryness, from want of proper nourishment. It is a species of *Alopecia*, which see.

XEROCOLLYR'IUM (*xērokollurion*, from *xēros*, dry; and *kollurion*, an eye-salve: *Gr.*), in Medicine, a dry collyrium or eye-salve.

XEROPH'AGY (*xērophagia*; from *xēros*, dry; and *phagein*, to eat: *Gr.*), the name given to a sort of fast which was adopted in the primitive ages of Christianity, and which consisted entirely of dry viands.

XEROPH'THALMY (*xērophthalmia*; from *xēros*, dry; and *ophthalmia*, a disease of the eyes: *Gr.*), in Medicine, a dry red soreness or itching of the eyes, without swelling or a discharge of humours.

XES'TES (*xestes*: *Gr.*), in Antiquity, an Athenian measure of capacity, answering to the Roman sextarius, and nearly to our pint.

XIPH'IAS (*Gr.*; from *xiphos*, a sword), in Ichthyology, a genus of fishes, including the common ***swordfish***, the ***Xiphias gladius***, which sometimes attains the length of 20 feet. The bones of the upper jaw project into a formidable weapon, the sword, which is flat above and below. It is an extremely rapacious fish, and finds in the above instrument a weapon of attack and destruction, able to procure it the most ample supplies. It is found in the Mediterranean, chiefly about Sicily, and is used by the inhabitants of that island for food. [See SWORDFISH.]

XI'PHOID (*xiphos*, a sword; and *eidos*, appearance: *Gr.*), a term given by Anatomists to parts which have some resemblance to an ancient sword; as the *xiphoid cartilage*, placed at the bottom of the breast-bone.

XYLAN'THRAX (*xulon*, wood; and *anthrax*, a coal: *Gr.*), in Mineralogy, *bovey-coal*. It consists of wood penetrated with petroleum or bitumen, and frequently contains pyrites, alum, sulphuric acid, &c.

XY'LO AL'OES (*xulon*, wood; and *aloē*, the aloe: *Gr.*), or *Aloewood*, in the Materia Medica, the product of the *Aquilaria Secundaria*, belonging to the *Aquilariaceæ*. It is the true aloewood, or *Calambac*, termed Agallochum, and must not be confounded with the *Aloexylon Agallochum*, of the nat. ord. *Leguminosæ*, which yields a scented wood used by the Chinese. It grows in China and some of the Indian islands. The Calambac is the most resinous of all the woods with which we are acquainted; it is of a light spongy texture, very porous; and its pores are so filled up with a soft and fragrant resin, that it yields to pressure like wax, or may be moulded by chewing in the mouth like mastich. Its scent, while in the mass, is very fragrant; and its taste acrid and rather bitter, but very aromatic and agreeable. It was formerly much esteemed in medicine, but is now little used.

XYLOG'RAPHY (*xulon*, wood; and *grapho*, I draw: *Gr.*), Wood engraving; the act or art of cutting figures in wood, in representation of natural objects. [See ENGRAVING.]

XY'LON (*xulon*, wood: *Gr.*), a species of punishment in use among the Greeks, which answered to our putting offenders in the pillory. It consisted in a heavy collar of wood, that prevented the delinquent from moving.

XYLOPHYL'LA (*xulon*, wood; and *phullon*, a leaf: *Gr.*—on account of the hardness and rigidity of its leaves), in Botany, a genus of plants, nat. ord. *Euphorbiaceæ*, the species of which produce their flowers at the edges of the leaves.

XYS'TARCH (*xustarchēs*; from *xustos*, the xystus; and *archo*, I govern: *Gr.*), an officer in the Grecian gymnasium, who presided over the *xystus*, as lieutenant to the gymnasiarch. His business was to superintend the *athletæ* in their exercises in the two *xysti*.

XYS'TER (*xuster*: *Gr.*), in Surgery, an instrument used for scraping bones.

XYS'TUS, or XYS'TOS (*xustos*, from *xuo*, I polish: *Gr.*—on account of its smooth and polished floor), in Ancient Architecture, an open or sometimes a covered court, of great length compared with its width, and consisting of porticoes with three sides. It was used for the performance of wrestling, running, &c., during the winter, and for walking in at other times. The Xystus made a necessary part of a gymnasium; and the name given to the athletæ who performed their exercises there was *Xystici*.

Y

Y, the twenty-fifth letter of the English alphabet. In the beginning of a word, it is considered to be a consonant; in every other position, a vowel. In the middle and at the end of words, *y* is precisely the same as *i*; being sounded as *i* long, when accented, as in *reply*, *defy*; and as *i* short, when unaccented, as in *synonymous*, *liberty*, *ability*, &c.——It was not introduced into the Latin alphabet till a late period; and was then confined to words borrowed from the Greeks, in which the Greek *υ* had been previously represented by the same letter instead of *y*. As a numeral it stands for 150 or, according to *Baronius*, for 159; and with a dash over it, for 150,000.

YACHT, a sailing vessel, pleasure-boat, or small ship with one deck, sufficiently large for a sea voyage. In its original signification, it is a vessel of state used to convey princes, ambassadors, and other great personages from one kingdom to another.

YAGERS (hunters: *Germ.*), higher servants, attached to aristocratic families in Germany. Also, light infantry armed with rifles, in Prussia, Austria, &c.

YAK, the *Bos grunniens* of naturalists, is an ox inhabiting the Himalayas. It has been domesticated, and is a very useful animal to the people of that mountainous region. It is employed as a beast of burden; its flesh is delicious, and its rich milk supplies them with much of their food. The long silky hair is spun into ropes, or woven into a material for tints. In appearance the yak resembles the bison; the usual colour is black, but white, red, and dun animals are common. They have large handsome eyes, spreading horns, and fine bushy tails. On the south side of the Himalayas the yak in winter feeds below 8,000 feet, but in summer it ascends as high as 17,000 feet. It emits a short grunt when excited, whence its specific name. The progenitor of this animal is the Wild Yak of Central Asia, which is untameable and very fierce.

YAM, a climbing plant belonging to the genus *Dioscorea*, cultivated in warm countries on account of its large farinaceous tuberous roots, which there form an important article of food when roasted or boiled. There are several species or varieties. The black bryony of our hedges belongs to an allied genus (*Tamus*), and its root also contains an edible fecula. The term yam is sometimes misapplied to plants belonging to the genus *Caladium* or *Colocasia*, also cultivated in warm countries on account of their edible tubers; these are the *taro* (or *kalo*) of the South Sea Islanders.

YAN'KEE, a popular name for a native of New England, but commonly applied to any inhabitant of the United States, as *John Bull* is to an Englishman, or *Mynheer* to a Dutchman. It is said to have originated in a corrupt pronunciation of the word *English* by the native Indians of America, who called the early settlers from Great Britain *Yengeese*.

YARD (*geard: Sax.*), a measure of three feet or thirty-six inches.——*Yards of a ship*, those long pieces of timber which are made a little tapering at each end, and are fitted each across its proper mast, with the sails made fast to them, so as to be hoisted or lowered as occasion serves. They have their names from the mast to which they belong. There are several sea-terms relating to the management of the yards: as, *square the yards*, that is, see that they hang horizontally, by the middle; *top the yards*, that is, make them stand even.——*Yard-arm* is that half of the yard which is on either side of the mast when the yard lies athwart the ship.——*Yard-arm and yard-arm*, a phrase applied to two ships when they are so near that their yard-arms nearly touch each other.

YARN (*gearn: Sax.*), primarily woollen thread; but it is applied also to other species of thread; thus to cotton and linen; and in rope making, to one of the hempen threads of which a rope is composed.

YAR'ROW, a well-known plant in our fields, belonging to the genus *Achillea* (nat. ord. *Compositæ*), and often called milfoil, or 'the plant of a thousand leaves,' from the excessive division of the foliage.

YAW, a sea-term, indicating temporary deviation from a direct course.

YAWS, in Medicine, the *Frambœsia* (*framboise*, a raspberry: *Fr.*), a severe cutaneous disease, introduced from Africa to the West Indies. It is said to derive its name from *yaw*, the African word for a raspberry. It affects a person but once, and is propagated solely by the infection of the matter of the pustules, applied to a part of the body where the skin is broken. It is not dangerous.

YEAR (*Sax.*), the period in which the revolution of the earth round the sun, and the accompanying changes in the order of nature, are completed. As regulated by the sun, it is called *solar*, and as regulated by the moon, *lunar*. The solar year is the interval of time in which the sun finishes his apparent course through the zodiac, and contains 365 days, 5 hours, 48 minutes and 49·7 seconds. The lunar year consisted of 12 lunar months. But besides the solar and lunar years, we may mention the *civil* year, which different nations adopted, without regard to *astronomical* accuracy, to render the computation of time in the common affairs of life more easy. The *Jewish* year consisted of 12 months, unless it happened to be intercalary, when it had 13 The ancient Hebrews used to regulate their months by the course of the sun, and each of them had 30 days; but after their captivity in Egypt, they adopted the lunar months, containing alternately 29 and 30 days, in all 354 days. This was made to agree with the solar year by adding eleven and sometimes twelve days at the end of the year, or by an *embolismic* month They had an *ecclesiastical* as well as a *civil* year. The first began in the month of Nisan or Abib, which answers to part of our March and April, because about this time the Israelites came out of Egypt. By this they reckoned their feasts The second began in the month Tisri, about the middle of our September, because they fancied the world to have been created about that time. The ancient Roman year was lunar, and the first month was March; then followed April, May, June, Quintilis, Sextilis, September, October, November, December, so that the *numeral* months were named according to their order in the series. Much confusion crept into the computation of the year, through inattention or ignorance, till the time of Julius Cæsar The year, as reformed by him, is a solar year, consisting of 365 days, except every fourth year, called bissextile, which contains 366. The *Julian* year, therefore, is 364 days 6 hours, exceeding the *Solar* year by 11 minutes, which in 131 years amount to a whole day Thus stood the year till the reformation of the Calendar by Pope Gregory. The *Gregorian* year is, consequently, the Julian year corrected, and is the year now used in Europe. From the difference between this and the Julian year arises the distinction of Old and New style ——The Mahometans begin their year when the sun enters Aries; the Persians in the month answering to our June, the Chinese and most of the Indians begin it with the first moon in March. At Rome there are two ways of computing the year—the one beginning at the Nativity, which the notaries use; the other in March, on occasion of the incarnation, and it is from this the papal bulls are dated. The civil or legal year in England, as well as the historical year, commences on the 1st of January. The church, as to her solemn service, begins the year on the first Sunday in Advent, which is always the nearest Sunday to St. Andrew's Day, whether before or after. See CALENDAR, CHRONOLOGY, CYCLE, &c] ——*Year and day*, in law, signifies a certain time that by law, in many cases, determines a right, or works prescription; as in the case of an estray, if the owner should not challenge it within that time, it becomes forfeited to the lord; so of a wreck, &c.

YEAST (*gest: Sax.*), the barm or froth which rises during the vinous fermentation of vegetable juices. It is a flocculent viscid matter, insoluble in water and alcohol; from its appearance under the microscope, it is now believed to consist of a fungoid growth. It putrifies in a warm atmosphere, and excites fermentation in saccharine and mucilaginous liquids It is also used in the making of bread, its property being to raise the dough, and by that means render it light and more wholesome.

YEL'LOW (*gealewe: Sax*), in Chromatics, one of the seven, or rather three, primary colours. It contains the smallest amount of chemical rays, and is therefore used by photographers, when light, destitute of chemical action, is required; thus, when a sensitive plate is to be examined

YEL'LOW-BIRD, in Ornithology, the *Fringilla tristis*, or American goldfinch, an active and gregarious bird, of a rich lemon-yellow colour; the crown, wings, and tail black The female and young are of a brown olive colour; and in winter the male assumes the same sober livery When caged, its song greatly resembles that of the canary

YEL'LOW-FEVER, in Medicine, a malignant disease frequent in hot climates, which often suffuses the skin with a yellowish colour. It is a bilious remittent fever.

YEL'LOW-HAMMER, or AMMER, the *Emberiza Citrinella* of ornithologists, a Passerine bird about 7 inches in length, found generally throughout Europe Its throat and the crown of the head are yellow. It is also called the yellow bunting

YEL'LOWS, a disease of horses, cattle, and sheep; in which the eyes are tinged with a yellow colour, proceeding often from obstructions in the gall-ducts.

YEN'ITE, in Mineralogy, a ferruginous silicate of lime, from Elba. It occurs both crystallized and massive, the form of the crystals being that of a rhomboidal prism. It somewhat resembles hornblende. This mineral is called *yenite* or *jenite*, in commemoration of the battle of Jena.

YEO'MAN (*geoman: Sax*), in English polity, a *commoner*, or a plebeian of the first or most respectable class. The term is now usually applied to a man who cultivates his own land for his support. In ancient times it denoted one of those who held *folk land*; that is, had no *fief*, or bookland, and therefore did not rank among the *gentry*. What the yeoman possessed, however, he possessed independently; he was, therefore, no man's vassal. To understand the true condition of the ancient yeoman, it must be observed that there were some lands which never became subject to the feudal system. These were called folk-lands, or the lands of the people. When, therefore, it is said that the sovereign is the lord of the soil of all England, the assertion is not strictly true. He is certainly the lord paramount of all fiefs; but he has no such reversionary interest in lands that were never held in fee. [See FEUDAL SYSTEM, GAVEL-KIND, &c]——The collective body of yeomen or freeholders is termed *Yeomanry*.——*Yeomanry of the Guard*. [See GUARD.]

YEO'MANRY CAV'ALRY, a body of volunteers composed chiefly of small landowners and farmers, meeting once a year in several of the English counties for military exercise. They receive a grant from government, and are under the command of the lord-lieutenant, who appoints the officers.

YEW (*iev: Sax.*), the *Taxus baccata* of botanists, an evergreen tree allied to the conifers, but having a fleshy fruit, not a dry cone. It is common in England and in many parts of the North of Europe. The wood, which is peculiarly hard, smooth, and tough, was manufactured into bows; but since the introduction of firearms, the tree is no longer planted except for ornament. The wood is beautifully veined, and susceptible of a very high polish. The leaves are extremely poisonous, and cattle are frequently destroyed by them.

YT'TRIA, in Mineralogy, the oxide of *yttrium*, a very rare earth, obtained from a species of *gadolinite*, discovered at Ytterby, in Sweden; hence its name. It resembles glucina in several of its properties. It is smooth and insipid, is infusible alone, but vitrifies with borate of soda. It combines with the acids, and is precipitated from those solutions by ammonia and prussiate of potash. It is perfectly white; has neither taste nor smell.

YT'TRIUM, a brittle metal of a dark-grey colour.

YT'TRO CERITE, a massive mineral, of a greyish or violet-blue colour. It consists of fluoric acid, yttria, oxide of cerium, and lime.

YT'TRO-TAN'TALITE, in Mineralogy, an ore of tantalum, containing yttria and oxide of columbium. It occurs massive, has a metallic lustre, and is of a blackish-brown colour. Under the blowpipe it decrepitates at first, but melts, by increase of heat, into a greenish-yellow clay.

YULE (*gehul: Sax.*), the name anciently given to Christmas. The word is probably Celtic: *wyl*, or *gywl*, in Welsh, signifies a holiday; perhaps the French word *noel* is derived from the same source.

YUNX, in Ornithology, the *Wryneck*, or *Yunx torquilla*, a bird which is nearly allied to the woodpecker. It makes no nest, but lays eight or ten eggs on the bare wood in hollow trees. In England it is a bird of passage, generally appearing a few days before the cuckoo. Its food consists of ants. It is never seen in flocks, and in pairs only during the spring and summer. Its name of *wryneck* is derived from a habit of twisting its neck in a singular manner.

Z

Z, the last letter of all modern languages, is generally considered as a double consonant, having in some languages the sound of *ts*, or *ds*. It begins no word originally English; and, though found in Saxon alphabets, it is not in any word originally Teutonic. As a numeral, Z stands for 2,000, and with a dash over it, for 2,000,000.

ZAC'CHO, in Architecture, the lowest part of the pedestal of a column.

ZAF'FRE (*zaffir: Germ.*), an impure oxide of cobalt, employed for giving a blue colour to pottery-ware and porcelain. The blue of zaffre is the most solid and fixed of all the colours employed in vitrification. It suffers no change from the most violent fire. It is successfully employed to communicate shades of blue to enamels, and to the crystal glasses made in imitation of some opaque and transparent precious stones, as the Lapis-lazuli, the Turquoise, the Sapphire, and others of this kind. The zaffre of commerce is never quite pure.

ZE'BRA, the *Asinus Zebra* of Zoologists, an animal of the horse family, is beautifully marked with stripes; and has a short mane, erect ears, and tail like an ass. It is a native of South Africa, about the size of a mule, and is wild, swift, and vicious. The *Asinus Burchellii*, another striped species, but more closely related to the horse than the last, is also a native of South Africa.

ZECHARI'AH, one of the minor prophets, who lived in the reign of Darius Hystaspes. The design of the first part of Zechariah's prophecy, like that of his contemporary Haggai, is to encourage the Jews to proceed with rebuilding the Temple. His style, like that of Haggai, is for the most part prosaic, especially towards the beginning; the last six chapters are more elevated; for which reason, among others, these six chapters are, by many commentators, ascribed to the prophet Jeremiah.

ZED'OARY, an aromatic stimulating root, employed in medicine. It is the produce of some plants belonging to the genus *Curcuma*, allied to those which produce ginger, cardamoms, and East Indian arrowroot.

ZEINE (*zea*, a kind of grain: *Gr.*), a substance of a yellowish colour, soft, insipid, and elastic, procured from the seeds of Indian-corn. It resembles gluten, but contains no nitrogen.

ZEM'INDAR (*zemin*, land: *Pers.*), in India, a feudatory or landholder who governs a district of country, and is receiver of the taxes. His jurisdiction is called a *zemindary*. It is liable to be sold by the government for arrears of revenue; in which case the leases of the ryots would be set aside. At present the land-tax is collected in India in three ways: by the *Zemindar settlement*, in which the Zemindar is responsible for it; by the *Mouzawan* or *Village settlement*, in which the collectors contract with the head-man of the village; and the *Ryotwari* or *Cultivator's settlement* in which the peasantry pay direct themselves.

ZEND-AVESTA (the living word: *Pers.*), the sacred books of the Parsees in India, and Guebers in Persia: books ascribed to Zoroaster, and supposed to contain his revelations. The language, after having been deciphered with difficulty, has been found to have a close relationship with Sanscrit.

ZEN'ITH (*Arab.*), in Astronomy, that point in the visible celestial hemisphere which is vertical to the spectator, and from which a direct perpendicular line passing through the spectator, and extended, would proceed to the centre of the earth. Each point of the surface of the earth has therefore its corresponding zenith——The *zenith distance* of a heavenly body is the arc intercepted between the body and the zenith, being the same as the co-altitude of the body.

ZE'OLITE (*zeo*, I boil; and *lithos*, a stone: *Gr.*). Many mineral substances have been confounded under this name, particularly such as, when fused under the blowpipe, melt with considerable ebullition. They generally consist of silica, alumina, lime, and water.

ZEPHANI'AH, a canonical book of the Old Testament, containing the predictions of Zephaniah, the son of Cushi, and grandson of Gedaliah; being the ninth of the twelve lesser prophets. He prophesied in the time of king Josiah, a little after the captivity of the ten tribes, and before that of Judah, so that he was contemporary with Jeremiah.

ZEPH'YRUS, or **ZEPH'YR** (*zephuros; from zophos*, darkness—which commences when the sun reaches the west: *Gr.*), the west wind; a wind blowing from that cardinal point opposite to the east. The poets personify it, and represent Zephyrus as a youth, and as the gentlest of all the deities of the woods. It is also called Favonius; though some consider Zephyrus and Favonius to be different.

ZER'DA, in Zoology, the *Megalotis* or Fennec, a beautiful little animal closely allied to the dog, and found chiefly in North Africa. It is of a yellowish-white colour, about ten inches in length, with a pointed nose, long whiskers, large black vivid eyes, and is remarkably fleet.

ZE'RO (*Ital.*), the point of a thermometer from which it is graduated. The zero of Fahrenheit's thermometer is fixed at the point at which the mercury stands when immersed in a mixture of snow and common salt, 32° below the freezing point. In Wedgwood's pyrometer, the zero corresponds with 1077·5° on Fahrenheit's scale. The zero of Reaumur's and of the Centigrade thermometers is the point at which water congeals.

ZE'TA, a closet or small chamber, with pipes running along the walls, to convey into it fresh air, or warm vapour from below.——Also, the Greek letter Z.

ZETET'IC (*zēteo*, I seek: *Gr.*), in Mathematics, an epithet applied to that method of investigation which proceeds by inquiry, or the solution of problems.

ZEUG'MA (*Gr.; from zeugnumi*, I join), a figure in Grammar, in which two subjects *are used jointly* with the same predicate; which strictly belongs to only one.

ZIBET', in Zoology, the *Viverra zibetha*, a carnivorous mammal, striped with wavy black lines and having an annulated tail. The *Viverra zibetha* holds the same place on the Asiatic continent that the *Viverra civetta* holds in Africa, and the *Viverra rasse* in Java.

ZIBE'THUM, *civet*, the soft, unctuous, odoriferous substance, produced by the *Viverra vivetta*, and *Viverra zibetha* or civet-cat. It has a grateful smell when diluted, an unctuous subacrid taste, and possesses stimulating, nervine, and antispasmodic virtues.

ZINC (*Germ.; from zinke*, a spike—from the forms it often assumes after fusion), a metal termed in commerce *spelter*. Its ore was known long before a mode of reducing it was discovered. It is procured either from *calamine*, the native carbonate, or from *blende*, the native sulphuret. It is of a blueish-white colour; its texture is lamellar and crystalline, and its spec. grav. about 7. It is tough and untractable under the hammer at common temperatures; it becomes brittle at 500°, and fuses at 770°; but between 220° and 320° it becomes malleable and ductile, so that between these temperatures it may be rolled into sheets, or drawn into wire. The zinc thus annealed and wrought retains the malleability it had acquired. When broken by bending, its texture appears as if composed of cubical grains. It may be granulated, like the malleable metals, by pouring it, when fused, into cold water, or if it be heated nearly to melting, it is then sufficiently brittle to be pulverized. Soon after it becomes red-hot, it burns with a dazzling white flame, of a bluish or yellowish tinge, and is oxydized with such rapidity that it flies up in the form of a white flocculent mass, called the flowers of zinc, philosophical wool, or *nihil album* (white nothing). This is generated so plentifully that the access of air is soon intercepted; and the combustion ceases, unless the matter be stirred, and a considerable heat kept up. The white oxide of zinc is not volatile, but is driven up merely by the force of the combustion; when it is again urged by a strong heat, it becomes converted into a clear yellow glass. If zinc be heated in close vessels, it rises without decomposition. The greater part of the zinc-works are situated in the neighbourhood of Birmingham and Bristol. The manufacture of brass, which has been long one of the staple articles of these towns, was probably the cause of the introduction of this branch of industry, at the period when brass began to be made by the direct union of copper with metallic zinc instead of calamine. Iron is often coated with zinc to preserve it from the action of the atmosphere, and is then termed 'galvanized.'

ZIN'GIBER (*zingibberis: Gr.*), in Botany, a genus of herbaceous plants containing the gingers. The white and black ginger are both the produce of the same plant, the difference depending on the mode of pre paring them. Ginger is considered as an aromatic, antispasmodic, and carminative; it is serviceable in flatulent diseases, debility, and in torpid and phlegmatic constitutions to excite brisker vascular action.

ZIR'CON, a mineral originally found in Ceylon, in the sands of rivers, along with spinel, sapphire, tourmalin, and ironsand. Zircon, hyacinth, and zirconite are regarded as varieties of the same species. They are essentially composed of the earth zirconia, with silica, and a minute portion of iron. Its common form is a rectangular four-sided prism.

ZIRCO'NIA, a rare earth extracted from the zircon; it is an oxide of zirconium. The salts of zirconia, unlike those of alumina and glucina, are precipitated by all the pure alkalis, and are insoluble when they are added in excess.

ZIR'CONITE, in Mineralogy, a variety of the *zircon*.

ZIRCO'NIUM, the metallic base of zirconia; it does not resemble a metal, being like charcoal powder. Heated in the air, it burns with almost explosive violence, forming the oxide.

ZO'DIAC (*zōdiakos kuklos*, the *Zodiac circle*: from *zōon*, an animal; on account of the constellations: *Gr.*). The word *circle* is omitted. In Astronomy, an imaginary ring or broad circle, in the heavens, in form of a belt or girdle, within which the greater planets all make their revolutions. In the very middle of it runs the ecliptic; and its breadth, comprehending the deviation or latitudes of the earlier known planets, is by some authors considered to be 16, by some 18, and others 24 degrees. The zodiac, cutting the equator obliquely, makes with it the same angle as the ecliptic, which is its middle line; which angle, continually varying, is now nearly equal to 23° 27′ 36·52″. This is called the obliquity of the ecliptic, and constantly varies between certain limits, which it can never exceed. The zodiac is divided into 12 equal parts, of 30 degrees each, called the signs of the zodiac, being so named from the constellations which anciently agreed with them [see CONSTELLATION]. But the stars having a motion from west to east, those constellations do not now correspond to their proper signs [see PRECESSION OF THE EQUINOXES]. And, therefore, when a star is said to be in such a sign of the zodiac, it is not to be understood of that constellation, but only of that division or 12th part of it.—It is a curious fact, that the solar division of the Indian zodiac is the same in substance as that of the Greeks; and yet that it has not been borrowed either from the Greeks or the Arabians. The identity or, at least, striking similarity, of the division has led to a supposition that the Brahmins received it from the Arabs. But it has been known among the Hindoos from time immemorial. The signs of the zodiac are Aries, Taurus, Gemini, Cancer, Leo, Virgo, Liber, Scorpio, Sagittarius, Capricornus, Aquarius, Pisces. They are counted from the vernal equinox, which is now in the constellation Pisces. Representations of the zodiac have been found in several ancient Egyptian temples, and have given rise to much discussion.

ZODI'ACAL LIGHT (*zōdiakos*, belonging to the zodiac: *Gr.*), in Astronomy, a nebulous aurora which accompanies the sun. It was supposed by Kepler to be the solar atmosphere, but it was accurately described by Cassimi, who gave it its present name. It appears immediately before sunrise in the months of September, October, and November, or after sunset in the months of March, April, and May. It has a conical or lenticular form, and is most distinct in tropical countries. Various hypotheses have been invented regarding it, that being considered the most probable which supposes it to be the ether, that is believed to fill space, loaded with the materials of the tails of numerous comets.

ZOLL'VEREIN (*Zoll*, toll; *Verein*, union: *Ger.*), a union of German States, headed by Prussia, formed for the purpose of establishing common regulations as to the customs duties.

ZONE (*zōnē*, a belt: *Gr.*), in Geography, a circular division of the earth with reference to the temperature. There are five zones: the *torrid*, extending from tropic to tropic, and twice the sun's greatest declination, or 47°, in breadth; the two *temperate* zones, situated between the tropics and polar circles, each 43 in breadth; and the two *frigid* zones, situated between the polar circles and the poles. The zones are distinguished from one another by various phenomena. To the inhabitants of the torrid zone the sun is vertical twice a year. In the middle of that zone the days and nights are always equal, each being 12 hours, and the twilight is short because the sun descends perpendicularly below the horizon. Within its limits there are only two seasons in the year, viz., winter and summer.

ZO'OLITE (*zōon*, an animal; and *lithos*, a stone: *Gr.*), an animal substance purified.

ZOOL'OGY (*zōon*, an animal; *logos*, a discourse: *Gr.*), the science which is concerned with the structure and classification of the beings constituting the ANIMAL KINGDOM. The chief divisions of this subject are treated of in this volume under the heads of VERTEBRATA, MAMMALIA, ORNITHOLOGY, AMPHIBIA, REPTILES, ICHTHYOLOGY, MOLLUSCA, ARTICULATA, ENTOMOLOGY, INSECTS, MYRIAPODA, CRUSTACEANS, CIRRHIPEDES, ANNELIDA, ROTATORIA, ENTOZOA, ECHINODERMATA, ACALEPHÆ, ZOOPHYTES, PROTOZOA, SPONGES.

ZOON'OMY (*zōon*, an animal; and *nomos*, a law: *Gr.*), the laws of animal life, or that science which treats of the phenomena of animal life, their causes, consequences, and relations.

ZOO'PHYTES (*zōon*, animal; *phuton*, plant: *Gr.*), an extensive class of invertebrate animals usually called *Polypes*, in the sub-kingdom *Radiata*. The appearance of these animals is very various; some secrete a horny tube in which they live; others secrete a great number of calcareous spicula [see ALCYONIUM, GORGONIA]; others secrete a hard stony substance known as CORAL; others a flexible branching body resembling a small bush [see ANTIPATHES];

whilst many species only secrete mucus [SEA-ANEMONE]. The simplest form of the animal is that of a fleshy bag with an opening at one end, forming the mouth, round which is placed a series of tentacles. The other end is the part by which it adheres to another object. The HYDRA, which is common in pools, where it adheres to plants, is of this simple structure. Most polypes are able to benumb other animals with which they may be brought into contact, and they have in their tissues offensive weapons possessing a stinging power which they discharge when irritated. They are all destitute of special organs of sense, nor has any distinction of sex been discovered amongst them. Most, if not all, deposit ova; many are also propagated by division or budding [see GEMMATION]. Some species consist of simple individuals; others are compound animals, such as the Corals and Gorgonias.

ZOOT'OMY (*zoon*, an animal; and *temno*, I cut up: *Gr.*), that branch of anatomical science which relates to the structure of the lower animals. [See COMPARATIVE ANATOMY.]

ZORILLA, in Zoology, a carnivorous quadruped closely allied to the weasels, having the back and sides marked with stripes of black and white, the last tinged with yellow; the tail long and bushy, partly white, and partly black; the legs and belly black. This animal inhabits South Africa.

ZU'MIC ACID (*zumē*, leaven; from *zeo*, I bubble up: *Gr.*), in Chemistry, an acid formed in sour bread, and vegetable substances which have undergone acetous fermentation.

ZUMOL'OGY (*zumoo*, I make to ferment; and *logos*, a discourse: *Gr.*), a treatise on the fermentation of liquors, or the doctrine of fermentation.

ZUMOM'ETER, or ZUMOSIM'ETER (*zumē*, ferment, or *zumōsis*, fermentation; and *metron*, a measure: *Gr.*), an instrument for ascertaining the degree of fermentation occasioned by the mixture of different liquids, and the degree of heat which they acquire in fermentation.

ZUR'LITE, a mineral, found in Mount Vesuvius, with calcareous spar. It occurs in rectangular prisms, or in botryoidal masses, of an asparagus-green, inclining to a grey colour. It is opaque, yields to the knife, and melts with borax into a black glass.

ZYGODAC'TYLOUS (*zugon*, a pair; and *daktulos*, a finger: *Gr.*), an epithet for an order of birds which have the feet furnished with two toes before and two behind, as the parrot.

ZYGO'MA (*Gr.*; from *zugoo*, I yoke together—because it transmits the tendon of the temporal muscle, like a yoke), in Anatomy, a bone of the head, or rather two processes of bones; the one from the *os temporis*, the other from the *os male;* these processes are hence termed the *zygomatic processes*, and the suture that joins them together is denominated the *zygomatic suture.*

ZYMO'TIC (*zumotikos*, causing to ferment: *Gr.*), in Medicine, diseases caused apparently by the reception into the system of a virus, or poison, which is diffused through the frame, and operates upon it like a ferment or leaven. In the Registrar-general's report, the following diseases are grouped together as *zymotic:*—Smallpox, measles, scarlatina, hooping-cough, croup, thrush, diarrhœa, dysentery, cholera, influenza, scurvy, ague, remittent fever infantine fever, erysipelas, and a few others.

SUPPLEMENT

TO THE

SCIENTIFIC AND LITERARY TREASURY.

The reader is requested to observe that the words printed in small capitals in the body of an article are intended as cross references, and that when the articles referred to are in this Supplement they are distinguished by the addition (*St.*).

ABD, a common prefix to Turkish and Arabic names, meaning servant; *e.g.*, Abdallah, the servant of God.

ABENCERRAGES, a noble Moorish family of Granada, descendants of Ebn Serraj, who opposed the king Abu Hassan. The whole family was enticed into the Alhambra and slaughtered by the king's orders about 1460. This formed the subject of a well-known story by Chateaubriand.

ABIOGENESIS (*a*, without; *bios*, life; *genesis*, generation: *Gr.*), the theory that living forms may be directly produced from non-organised bodies, such as carbonic acid, ammonia, and water. It is sometimes termed heterogenesis (*heteros*, unlike: *Gr.*), or spontaneous generation. The opposite and generally accepted theory, *biogenesis*, asserts that all organised bodies proceed from pre-existing forms of a similar kind.

ACADEMY, FRENCH. [See INSTITUTE, FRENCH (*St.*).]

ADVENTITIOUS BUDS, in Botany, are those which do not make their appearance in the axils of leaves, or at the growing apex of a plant. Under ordinary conditions they are of rare occurrence, and they are considered abnormal; but ferns grown under glass often produce them abundantly.——ADVENTITIOUS ROOTS are those produced above the ground, and they are therefore often termed aërial. The ivy clings to its support by such roots.

ADVERSARIA (*Lat.*), a book of notes.

AGGLUTINATIVE (*ad*, to; *glutinare*, to glue or solder: *Lat.*), a term applied by philologists to such languages as those of the ALTAIC (*St.*) or Turanian division, which do not inflect their verbs, but add other words to them when time and other varieties of signification are intended to be expressed. But Mr. E. B. Taylor says that the distinction between the so-called inflecting languages, such as Greek and Hebrew, and the agglutinating languages is much exaggerated, for he thinks that inflection is a kind of extreme agglutination.

AGNOSTICISM (*agnostos*, unknown: *Gr.*), the doctrine which teaches that nothing is known as to the manner in which the world came into existence.

AGORA (*agora*: *Gr.*), in ancient Greece a general assembly for dealing with public affairs; also, a place where such assemblies usually met; a forum, a market-place.

AHRIMANES. [See ORMUZD (*St.*).]

ALIZARINE (from the Arabic name for madder), a red colouring matter used in dyeing and obtained from the root of the madder plant. An efficient substitute for it is obtained from coal tar, and is called artificial alizarine. This is rapidly displacing the madder dye.

ALTAIC or **UGRO-ALTAIC** Languages, a group termed Turanian and Scythian by some writers. In addition to Turkish and Mongolian, they comprise the Finno Ugric tongues, viz., the Finn, Esthonian, Lapp, &c., spoken on the borders of the Baltic; the Permic tongues of the Ural Mountains; the Bulgaric tongues of the Volga; and the Ugric tongues of the Danube and Obi, *e.g.*, the Magyar of Hungary.

ALTAZIMUTH INSTRUMENT, in Astronomy, a telescope mounted in such a way as to be capable of motion in two planes at right angles to each other, the amount of its angular motion in each being measured on two circles co-ordinate to each other, whose planes are parallel to those on which the telescope moves. The principal axis of the mounting occupies a vertical position, and whilst one circle corresponds to the celestial horizon, the other corresponds to a vertical circle of the heavens. The angles measured on the former circle are differences of azimuth, those on the latter are zenith distances or altitudes.

AMESS or AMICE (*amictus: Lat.*), a square piece of linen worn on the shoulders by priests in the Roman Catholic Church. Amongst the ancient Romans the amictus was a garment worn over the tunic.

AMŒBA, a minute animal found in stagnant water, and belonging, like the FORAMINIFERA, to the class of Rhizopoda, but it is destitute of a shell. It is a mere shapeless speck of sarcode without skin or organs of any kind, but possesses both a nucleus and a pulsating cavity. It moves slowly by protruding a portion of its mass, and then following with the rest. Its food is drawn into its body at any part, and what remains indigested is rejected in the same manner. The individual increases by dividing and forming two. A still more rudimentary form of animal life is the homogeneous particle of protoplasm destitute of nucleus and pulsating cavity, which Professor Haeckel named *Protamœba*. It is found in the fresh waters of Germany.

AMPHIOXUS (*amphi*, at each end; *oxus*, sharp: *Gr.*), the Lancelet, a ribbon-shaped animal about two inches long, living in sand at the depth of a few fathoms off the British coast. It possesses a spinal cord enclosed in a gelatinous sheath, but without vertebræ, cranium, or bones. It is, however, placed in the order of fishes, of which it is the lowest member. Insignificant as it appears to be, it is a very important link in tracing the descent of animal existences, and some anatomists look upon it as the only living animal which can give us an approximate conception of man's earliest vertebrate ancestors.

AMPHITRYON, a mythic Greek hero, whose name is often used by the French for a host, in allusion to the story that during Amphitryon's absence from home, Jupiter in his likeness paid a visit to his house and gave a feast. Before its conclusion the real Amphitryon returned, and claimed the honours of the position; but the guests rejected his claim, declaring that the true host was he who gave the feast; or as Molière expressed it, 'Le véritable Amphitryon est l'Amphitryon où l'on dine.'

AMPLITUDE, the, of a vibration or oscillation, means the extent of the swing of the body from its extreme point on one side, to the extreme point on the other. In sonorous vibrations the loudness of the sound is in proportion to the square of the amplitude. It has been calculated that the amplitude of a vibration sufficient to produce sound is less than the ten millionth of a millimetre.

ANACRUSIS (*ana krousis*, a keeping back: *Gr.*), in Prosody and Music, the ictus or beat by which the time of a verse or melody was measured.

ANDIRONS, the iron supports in old fireplaces of the ends of the logs of wood which were burned on the hearth. Some suppose the word to be a corruption of *end irons*. Their extremities facing the room were often fancifully ornamented, and they were sometimes called dogs, the ornament having often been a dog's head.

ANIMISM (*anima*, a soul: *Lat.*), the belief in spiritual existences. Many different ideas relating to the external world are comprehended under this term.

APOLOGY (*apologia*, vindication: *Gr.*), in Literature, a treatise composed in support or defence of some doctrine, book, or person. Hence *apologetic* writings, as Bishop Watson's 'Apology for the Bible.'

APOSIOPESIS (*Gr.*), in Rhetoric, the breaking off by design in the middle of a sentence, and commencing another one.

ARAGONITE, one of the natural forms of carbonate of lime, originally found in Aragon, but afterwards in many other places. Its crystals are hexagonal prisms. It is deposited by some hot springs, and it forms the troublesome deposit of steam boilers.

ARAMAIC, a Semitic language which had two principal dialects, the Syriac and Chaldean. It derived its name from Aramaa, signifying 'highland,' that part of Syria which is on the left bank of the Jordan.

ARAUCARIA (*Araucans*, the Indians of Chili), a genus of handsome coniferous trees, of which only one is cultivated in the open air in England, the *A. imbricata*, a native of Chili, the other species being too tender for our climate. The Norfolk Island pine, young plants of which are frequently seen in hot-houses, is *A. excelsa*. In New Caledonia and some neighbouring islets grows the *A. Cookei*, a tree of so singular a habit, that when first seen from the deck of his vessel, Captain Cook says, that his 'philosophers were positive they were pillars of basaltes, like those which compose the Giant's Causeway.'

ARBOR SATURNI (the tree of Saturn: *Lat.*), the tree-like deposition of metallic lead from a salt in the presence of metallic zinc. [See ARBOR DIANÆ.] The alchemists gave the name of Saturn to lead.

ARC, ELECTRIC, the light which appears between the carbon or other electrodes, when a sufficiently powerful current is passing.

ARCHIMANDRITE (*archimandrites: Gr.*), the chief of a monastery in the Greek or Eastern Church.

AREOMETER (*araios*, thin; *metron*, a measure: *Gr.*), an instrument for measuring the densities of fluids. Hydrometers and saccharometers are areometers.

ARGAN TREE, a tree belonging to the genus *Argania*, nat. order *Sapotaceæ*, which grows in Morocco. Camels and other domesticated animals are fed on its fruit, a drupe, and from the kernel of the nut an oil is extracted, which is largely used in the country.

ARMATURE, a piece of iron placed at the poles of a horseshoe magnet, which has the effect of preserving the magnetic power for a long time.

ARNAOUTS, the Turkish name of the Albanians, who call themselves Skipetar. They are believed to be descendants of the ancient Thraco-Illyrians. In religion they are Mohammedans.

ASSEGAI, a spear of wood tipped with iron, used by the Caffres of South Africa.

ASTATIC (*astatos*, not constant: *Gr.*). In the science of Magnetism a needle which is not affected by the earth's magnetism, and which, when freely suspended, will steadily remain in any position in which it may in a horizontal plane be placed, is styled astatic. Such a needle may be constructed by combining two magnetised needles, so that their poles are turned in opposite directions.

ASTEROIDS. The discovery of new ones has proceeded rapidly of late years. Up to the end of 1879, the number of known asteroids was 211. [See ASTEROIDS.] One, which has received the name of Hilda, is remarkable for the length of its period of revolution round the sun, nearly eight years.

ATMOSPHERE. At the level of the sea the mean pressure of the atmosphere is about 15 lbs. on the square inch. When gases, &c., are subjected to compression by mechanical means, the pressure is often stated in terms of the atmospheric pressure as a unit. Thus a pressure of ten atmospheres means a pressure of 150 lbs. to the square inch.

ATTWOOD'S MACHINE, an apparatus invented by Mr. Attwood of Cambridge at the close of the last century, for the purpose of illustrating and verifying the laws of falling bodies.

AURANTIACEÆ, in Botany, an order of polypetalous trees and shrubs, natives of warm climates, and having leaves abounding with a fragrant volatile oil. To this order belongs the genus CITRUS (*St.*), containing the CITRON, LEMON, ORANGE, and SHADDOCK. The Wampee, a Chinese fruit, is produced by the *Cookia punctata;* the Bengal Quince or Marmelos, a delicious East Indian fruit, is yielded by the *Ægle marmelos;* the Elephant Apple is the fruit of *Feronia elephantum*, which grows on the Coromandel coast; and there are other fruit trees in the order.

AUROCHS, more properly AUERROCHS (*Germ.*), the extinct *Bos primigenius*, which was living in England and Germany in Cæsar's time. It is supposed to be the progenitor of the half-wild cattle in Chillingham Park. Its bones are sometimes disinterred in bogs and caves.

AUTOCHTHONES (*autos*, itself; *chthon*, the soil: *Gr.*), the aboriginal inhabitants of a country, which the Greeks expressed by saying they had sprung out of the ground.

AUTONOMY (*autos*, itself; *nomos*, a law: *Gr.*), in Politics, the possession by a country of the right to make its own laws.

AVENTURINE, in Mineralogy, rock crystal with disseminated scales of mica, or crystals of copper, found in several parts of the world. Artificial aventurine is glass in which minute particles of brass or copper are mixed. It is said to derive its name from its having been first made at Venice by the accidental (*a ventura*) fall of some brass filings into melted glass. The mineral was named from its resemblance to the artificial substance.

AZOIC (*a*, without; *zoe*, life: *Gr.*), a term applied to geological strata in which no organic remains have been found.

AZTECS, the principal race of people living in Mexico when the Spaniards discovered the country in the thirteenth century. They are thought to have come from Nicaragua, where it is said there is still a tribe speaking their language. They were powerful and civilised, but their religious rites were very sanguinary.

B

BACTERIA (*bacterion*, a little rod: *Gr.*), minute rod-shaped vegetable organisms which are found abundantly in animal or vegetable infusions after they have been exposed to the air for some hours. The germs are believed to float about in the atmosphere until they find a suitable place for their development, when they multiply with great rapidity. It has been thought that various diseases of the human body arise from bacteria having effected an entrance into it.

This is the so-called germ theory of disease.

BAILY'S BEADS, in Astronomy, the red prominences seen at the edge of the sun at the time of a total eclipse. They are outbursts of ignited hydrogen, and were so named from Mr. Baily the astronomer.

BALAUSTA (*balaustion*, the flower and young fruit of the pomegranate: *Gr.*), the name given by botanists to the apple-like fruit of the pomegranate (*Punica granatum*, nat. order *Myrtaceæ*), which they consider a modification of the berry. Its structure is very peculiar, and perhaps unique in the vegetable kingdom, as the fruit is many-celled and there are two rows of carpels, one placed above the other.

BANTU (*abantu*, people: *Caffre*), the name given by philologists to the languages spoken in Africa from the Cape Colony northwards as far on the west to the 8th parallel of N. latitude and on the east up to the equator. It includes numerous forms which are usually divided into three groups: (1.) The eastern languages, Caffre, Zulu, and those spoken on the Zambesi and in the neighbourhood of Zanzibar, (2.) the middle group, spoken by the Basutos, Bechuanas, &c., (3.) the western group, spoken by the races on the lower course of the Congo, and in the country claimed by the Portuguese on the west coast.

BANYAN TREE, the *Ficus Indica* of botanists, is remarkable for having large horizontal branches that send down roots which enter the ground, become stout, and serve as props. In this way a single tree will form a grove. A similar mode of growth is possessed by the *Ficus columnaris* of Howe's Island, and is occasionally seen in the Moreton Bay Fig (*F. macrophylla*) and the common New South Wales Fig (*F. Australis*).

BAPTISTERY, the place in churches where the baptismal font is placed and the rite of baptism performed. In some Italian cities it is a large detached building, circular or octagonal in plan, covered by a dome. Those of Florence and Pisa are celebrated for their architecture and connection with early art.

BARITONE (more properly BARYTONE; *barus*, deep, *tonos*, tone: *Gr.*), the low tenor or high bass voice of males.

BARKER'S MILL. [See TURBINE.]

BARNABITES, an ecclesiastical order founded at Milan in 1430. The members devote themselves to nursing the sick, cure of souls, education, &c., without seeking higher preferment. There are about twenty colleges in Italy and Austria, their headquarters being at Rome.

BAROSCOPE (*baros*, weight, *scopein*, to see: *Gr.*), the name of an apparatus for showing that the weight of a body in the air is affected by the upward pressure of the air upon the body. It consists of a balance, to the opposite arms of which are attached two balls of very unequal sizes which balance each other in the air. When this apparatus is placed under the receiver of an air-pump, the larger ball will be seen to descend as the air is exhausted, thus showing that the upward pressure of the air had previously prevented it overbalancing the smaller ball.

BASHI-BAZOUKS (those who fight without science: *Turk.*), the irregular soldiers of the Turkish army, comprising men of all races. They have earned an unenviable notoriety for rapine and cruelty.

BESSEMER STEEL, steel made by the process invented by Sir H. Bessemer, of driving air into melted iron so as to get rid of part of the carbon.

BIGNONIACEÆ, in Botany, a natural order belonging to the class of Calicifloræ, and containing trees and shrubs which are often climbers. The genera *Bignonia* and *Tecoma*, inhabitants of warm countries, have many species with handsome trumpet shaped flowers. *Catalpa syringifolia* with purple flowers, has been introduced as an ornamental tree into Europe. The *Crescentiaceæ*, to which the CALABASH TREE belongs, are sometimes considered a section of this order.

BILLET MOULDING, an ornament employed in Mediæval Architecture, around doors and windows. It is shaped like a number of wooden billets piled one above another, and is frequently accompanied with the zigzag moulding.

BILLION (*Fr.*), a million of millions (1,000,000,000,000). In French, billion or milliard signifies a thousand millions.

BINOMIAL THEOREM, in Mathematics, a method of expanding $(a + b)^n$ into a series, either finite or infinite, as the case may be, of powers of a and b. In other words, it is a formula for expressing any power of a binomial quantity. It is a theorem of special importance in elementary algebra, and was discovered by Sir Isaac Newton.

BUTYL, in Chemistry, a hydrocarbon radical analogous to methyl, ethyl, &c., and forming like them alcohols, ethers, &c. Butylic alcohol is lighter than water. If applied to the lips and tongue when in a pure state, it produces a sensation of burning, and after the burning sensation has passed off there remains an extreme feeling of numbness in the part. It has been found useful in relieving pain such as toothache, by applying it to the part affected. Diluted with water, it is not unpleasant to take when sweetened.

BY PRODUCT, anything produced in the course of manufacturing the article which is the main object of the process; for example, tar, in distilling coal for gas.

C

CACHET, Lettres de (*cachet*, seal: *Fr.*), private sealed letters or papers which the kings of France before the Revolution were in the habit of issuing for the arrest of persons without any cause being alleged, and such persons were either imprisoned or expelled the kingdom without trial. They were abolished by a decree of the National Assembly in 1789.

CAFTAN (*Turkish*), a robe-like article of dress worn by men.

CAIRNGORM STONE, a variety of smoky quartz found in Scotland, and named from the mountain Cairngorm in Inverness-shire. It is cut and polished for the purpose of being made into personal ornaments.

CALAMITES, in Geology, fossil plants allied to the living horse-tail, but growing to a much larger size, which are found in the Carboniferous beds.

CALCITE (*calx*, lime: *Lat.*), a general name for mineral carbonate of lime.

CALDARIUM (*Lat.*), the hot room in Roman baths.

CALENDS (*calendæ*: *Lat.*), the first of the three periods into which the Roman month was divided. The Greeks had no calends in their month divisions; hence the Latin proverb, 'to pay at the Greek calends,' meant never to pay.

CALMS, Region of, the zone which separates the trade-winds of the two hemispheres. It alters its position a little as these winds in the course of the year change their place. In the Atlantic Ocean it has a breadth of from two to three degrees, lying a little north of the equator.

CALOYERS (*kalogeros*: *Mod. Gr.*), monks of the Greek Church.

CAMBIUM (*cambiare*, to change: *Lat.*), in Botany, the mucilaginous semi-fluid matter which is found between the bark and the wood of a tree. Delicate cells abound in it, which in the end form woody fibre or ligneous tissue. The function of cambium is to aid in the formation of new wood.

CAMORRA, a secret society in Naples which under threats of violence extorts money from persons of property, and undertakes the assassination of any one at the instance of an enemy. The members (called *camorristi*) of this dangerous society are kept under very strict discipline by the leaders. It has resisted all the efforts of the Government for many years to suppress it.

CAMPANOLOGY (*campana*, a bell: *Mediæval Lat.*), science pertaining to large bells for ringing, their proper form, materials, &c.

CAMPO SANTO (holy field: *Ital.*), the name given in Italy to a cemetery. Most of the Italian cities have large cemeteries adorned with works of sculpture. The most celebrated of the old *campi santi* is the one at Pisa. It is a small piece of ground surrounded by a high wall upon which are frescos by early masters.

CANDLE-NUT TREE, the *Aleurites triloba*, nat. order *Euphorbiaceæ*, a native of the larger Polynesian Islands. The natives of the Sandwich Islands string together the oily kernels of the nuts and burn them like a candle.

CANNA, in Botany, a genus of herbaceous plants, natives of tropical countries, belonging to the nat. order *Marantaceæ*. Having broad leaves and ornamental flowers, several species are cultivated in hot-houses. The seeds being round, hard, and black, have received the name of Indian shot. From the root stock of *Canna edulis* the starchy edible matter known as tous-les-mois is prepared.

CANON, a musical composition in which the same melody is repeated at a given distance of time in intervals of corresponding value and pitch.

CANON or **CANYON** (a great pipe, *Span.*, from *canna*, a pipe: *Lat.*), a long and very narrow ravine between high walls of rock. The cañons on the W. side of the Rocky Mountains are often of great length. The Grand Cañon of the Colorado is 550 miles long, and in one place is only 100 feet wide, whilst its depth at another is 6200 feet.

CARAGEEN, or Irish Moss, a preparation made from some sea-weeds belonging to the genus *Chondrus*. Their fronds contain a substance of a starchy nature and this being extracted by boiling, forms a jelly when cold.

CARBOLIC ACID, or Phenol, a liquid largely employed as a disinfectant. It has a very penetrating odour, and a burning taste; if swallowed, it is a violent poison. It is a little heavier than water, in which it is only slightly soluble. It is obtained by the distillation of coal-tar oil, and subsequent treatment. Its chemical constituents are carbon, hydrogen, and oxygen.

CARNIVOROUS PLANTS. The viscid glands on the leaves of the Sun dews have been mentioned under Drosera. The fact has long been known, that when flying insects settle on these leaves, they are retained by the viscid secretion, and the margins of the leaves fold over them. It is now said that the softer parts of the prey are absorbed by the plant, and digested by a secretion which acts like the gastric juice of animals. Experiments were undertaken by

Mr. F. Darwin, with a view to ascertain whether the plants were benefited by animal matter being placed on the leaves, and he came to the conclusion, that by absorbing and assimilating such matter, the plants were rendered more vigorous. He took a number of plants and carefully fed some of them by placing flies on their leaves, the others being protected from the approach of insects. The apparent result of the experiments was to show that the fed plants produced more and heavier seeds than the unfed series. The value of these experiments has, however, been called in question, and the matter cannot be said to be finally decided. [See VENUS' FLY-TRAP (*St.*).]

CARPEL (*karpos*, fruit: *Gr.*), in Botany, that part of the ovary or seed-vessel to which the ovules are attached. Theoretically the ovary is a folded leaf, and the carpel is at the introverted edges. The upper part of the leaf or prolonged midrib forms the pistil. There may be one or more carpellary leaves; in the latter case they unite to form the ovary, and the carpels are the in-turned edges.

CARPETS. Great diversity of texture is to be seen in carpets. Some show the same pattern and material on both sides with reversed colours. Others have a woollen surface on the upper side, and a rough one of hemp or flax on the under side. Some have a velvety surface with a pile or nap. Another kind is soft, with the ends of the fibres upright and half-an-inch deep. The commonest kind of carpet is the felt. This is not woven, but the wool is felted together, and the pattern printed afterwards. The simplest form of the woven carpet is that called Venetian, which is composed of a striped woollen warp on a thick woof of linen thread. The Kidderminster or Scotch carpet is so constructed as to constitute a double cloth, having two sets of worsted warp and two of woollen weft, each warp being intersected by both the wefts. It is like two pieces of cloth united surface to surface. The pattern is the same on both sides, only the colours are reversed. The Brussels carpet has a strong linen thread basis. In weaving the woollen part the threads are from time to time drawn up in loops to form the figures. In this carpet the weaver is restricted to seven colours. The Wilton carpet is nearly the same as the Brussels, except that the yarn is cut. The Turkey carpet is made entirely of wool, the long loops are cut, and the carpet is therefore very soft. Axminster carpets are not woven, but produced by hand. Each thread is knotted to the foundation, and is not connected with any other thread. This carpet is made in a frame, and to this class belong the carpets known as Velvet pile, Royal pile, and Saxony carpets. Tapestry carpets are needle-work carpets with which machinery has very little to do.

CATALAN, a native of Catalonia in Spain.

CATHETOMETER (*kathetos*, a vertical line; *metron*, a measure: *Gr.*), an instrument for determining the precise distance between two points in a vertical line.

CAUCUS, the name applied in the United States to a political meeting held as a preliminary to the legal and formal one. The course of action and main business of the party at the latter can thus be arranged beforehand.

CENTIGRADE (*centem*, a hundred; *gradus*, steps: *Lat.*), an epithet applied to anything divided into a hundred equal parts or degrees, but especially to the mercurial thermometer, when the scale between the temperatures of freezing and boiling water is so divided. This is the scale used on the Continent, and is indicated by the letter C. This scale is also called Celsius, after a professor of that name at Upsala who used it. To convert centigrade degrees into Fahrenheit, multiply the number of degrees by 9, and divide the product by 5, then add 32. To convert Fahrenheit degrees into centigrade, first subtract 32, then multiply the difference by 5, and divide the product by 9. [See THERMOMETER.]

CENTRAL POINT, in Astronomy, that point in space around which some astronomers suppose that the great system of stars—of which the solar system forms part—is moving, just as the earth moves round the sun. This point is placed somewhere in the group of the Pleiades. It has been calculated that the period of the revolution of our sun round the point in question is 18,200,000 years, and that the sun's velocity in his orbit is at the rate of 1800 miles a minute. Many years must elapse before materials can be obtained for testing the accuracy of these calculations.

CHAMFER, a term employed by carpenters and masons to signify the bevelling off of an edge so as to produce a surface inclined to the face at each side of the bevelled surface.

CHAMPAGNE WINE is produced in a district in the north-east of France occupying part of the old province of Champagne, especially in the neighbourhood of Rheims and Epernay. It is made either 'sparkling' or 'still,' that is, with or without a charge of carbonic acid gas. The former quality is produced by bottling the wine whilst its fermentation is still incomplete,—and a pressure of gas of from four to six atmospheres is allowed to remain. Hence the bottles are required to be very strong, notwithstanding which there is a considerable loss from their bursting during the manufacture.

CHAPELLE ARDENTE (*Fr.*), the hall in which the dead body of a person of high rank dying in the Roman Catholic faith lies in state. It is hung with black, is illuminated with candles, and there is a temporary altar.

CHICKEN POX, an eruptive disease of children, resembling smallpox, but of a much milder form, with less fever, more rapid progress of the eruption to maturity, and less appearance of purulence in the fluid of the vesicles.

CHILIASTS (*chilias*, a thousand: *Gr.*), believers in the near approach of the millennium.

CHINA GRASS, a plant, the *Boehmeria nivea* of botanists, belonging not to the order of grasses, but to the nat. order *Urticaceæ*. It is grown in India, China, and Japan, for the sake of the fibre, called by the Malays and the French Ramie, contained in its stems. This fibre is very strong, and besides being worked up into string fishing-nets, &c., it is so soft and fine that the Chinese make their grass cloth from it.

CHINCHILLA, a small rodent animal living in holes in the ground in the mountainous districts of Chili and Peru. The skins are largely imported into this country on account of the grey fur, of which articles of ladies' dress are made. The body of the animal is about nine inches long. The dogs with which they are hunted are trained not to injure the fur.

CHINESE LANGUAGE. This is described as language in its most archaic form; there is no alphabet, every word is a root, and every root a verb, without conjugations or inflections, or even agglutination. The adjectives are indeclinable. There are two hundred and fourteen determinatives or radical characters, which, in combination with their primitives, are exactly paralleled by (without being at all similar to) many Egyptian and Assyrian characters. Five hundred syllabic sounds are employed, which by varying their position in a sentence are made to represent thousands of distinct symbols, so that the same character may in turn play the part of verb, substantive, adjective, or adverb.

CHINOLINE, in Chemistry, a base obtained by distilling cinchonine, quinine, or strychnine with caustic potash. Its hydrochlorate has been employed as an anæsthetic. A base isomeric with this has been obtained by the destructive distillation of coal.

CHITINE (*chiton*, a skin or coat: *Gr.*), the horny material which gives strength to the integuments of crustaceous insects, and others of the lower animals. It contains nitrogen.

CHLORIMETRY, the processes by which the quantity of chlorine contained in a given weight of chloride of lime is ascertained by bleachers.

CHLORODYNE, a medicine, the ingredients of which are kept secret, but believed to be a compound of morphia, extract of Indian hemp, chloroform, and ether.

CIRCULATING DECIMAL, a decimal in which a series of digits is continually repeated. Thus, dividing unity by 7 we obtain ·142857, and if the process is continued, the same series of figures is repeated *ad infinitum*. This particular case is very remarkable, for if we multiply the series by 2, we obtain 285714; by 3, we have 428571; by 4, we have 571428, &c., and it will be found that it is possible to write down 96 digits such that their first 96 multiples consist of the same digits in the same cyclical order. It is usual to place a dot over the first and last digits of a recurring series, thus ·15723.

CIST (*cista*: *Lat.*), in Ancient Sculpture, a basket represented as carried in processions, and supposed to have reference to the mysteries of Ceres and Bacchus. Also, a round bronze box found in Etruscan tombs containing articles of a woman's toilette. Also, a sepulchral chest of stone or terra-cotta, closed at the sides and furnished with a lid.

CITRUS, in Botany, a genus of fruit trees, nat. order AURANTIACEÆ (*St.*), containing the CITRON, LEMON, LIME, ORANGE, SHADDOCK, &c. The peculiarly formed fruit, called Hesperidium by botanists, has the epicarp and mesocarp as a separable rind, whilst the endocarp divides the pulpy portion containing the seeds into three cells. The juice of these fruits contains CITRIC ACID.

CLAQUE (*Fr.*), a band of hired men (*claqueurs*) who are regularly organised under a leader, and distributed about a theatre to applaud at the proper times during the performance of a new piece on the Paris stage, as well as to stifle adverse criticism or signs of disapprobation.

CLEARING HOUSE, BANKERS', an establishment in London, at which bankers who are members daily present the cheques and bills placed in their hands for collection from other bankers. A banker, instead of sending to every bank upon which he holds cheques to collect the amount in cash, sends a clerk to the Clearing House, where the difference between the amounts of drafts in his favour and upon him is ascertained, and the balance paid by a cheque on the Bank of England. This method of transacting this part of their business saves much trouble, and obviates the risks of collecting cash. The amount transferred at the Clearing House in the course of a year is about five thousand millions of pounds sterling.

CLEISTOGAMIC (*kleistos*, locked up; *gamos*, marriage: *Gr.*), an epithet applied by botanists to flowers which are so constructed that the pollen cannot fertilise the pistil of the same flower.

CLUNIAC, an order of monks founded in A.D. 930, by Odo, abbot of a Cistercian monastery at Clugny, or Cluny, near Macon. Their house in Paris has become the Musée de Cluny.

COLOUR BLINDNESS, a not uncommon defect of the human eye, which seems usually to consist of inability to perceive the true colour of red. To persons thus affected scarlet appears as a deep dark colour, and all the compound hues into which red enters are altered. Thus orange and purple are deprived of their red component. Colour blindness with respect to green and violet also occurs, and occasionally a person is met with who is blind to all colours. When the defect is congenital there is no remedy for it. Persons employed in situations where an accurate perception of colour is needed, such as those employed on railways, or sailors, whose duty it is to be guided by signals with coloured lights, ought to undergo a careful examination with regard to this defect, for there is reason to believe that fatal accidents have been caused by the mistakes of the colour blind.

COLOURS. It is now said that it is a popular mistake to suppose that the three primary colours are red, yellow, and blue, for green ought to be substituted for yellow, as regards mixtures of lights, or combinations of colour sensations, and Professor Clerk Maxwell states that the orange and yellow of the spectrum can be exactly reproduced by mixtures of red and green.

CONSCIOUSNESS (*conscius*, knowing something along with others: *Lat.*), the faculty of knowing, the capacity of having mental impressions or feelings. It is the necessary condition of knowledge and experience, and is divisible into two departments—Object consciousness, and Subject consciousness. Everything that we can know or conceive of falls into one or other of these divisions, which comprehend the entire universe so far as we can ascertain it.

CONTRALTO (*Ital.*), or counter-tenor, a range of singing voice between the treble and the bass.

CONTRAPUNTAL (*Ital.*), what relates to the science of harmony or counterpoint.

CONVECTION OF HEAT (*convectio*, a carrying along with: *Lat.*), the diffusion of heat by the motion of the heated particles; thus when heat is applied to the bottom of a pan filled with water, the lowest strata, being first heated, ascend and diffuse heat by convection amongst the cooler water above.

COOLY (*kuli*, wages: *Tamil*), a Hindoo cultivator of the soil.

COPAL. Zanzibar copal or animi is a resin found in the earth on the east coast of Africa. It exuded from a tree called *Trachylobium Hornemannianum*, a still living species.

CORRUGATED IRON, sheet iron rolled into straight and equidistant ridges. It is employed for roofing and for the sides of temporary structures. The process gives increased strength to the material.

CORTILE (*Ital.*), the court around which a palace is built in Italy. It is often decorated on one or two stories with arcades.

COSMOS or KOSMOS (the world: *Gr.*), the order or arrangement of the universe. *Cosmical*, in opposition to Telluric, phenomena are those which show themselves beyond the bounds of the earth.

COUPLES, THEORY OF, a mathematical conception invented by Poinsot, which has proved fruitful of results in its application to the solution of problems in mechanics. A couple consists of two equal and parallel forces acting in opposite directions at the extremities of a rigid straight line. Such forces cannot be replaced by a single force (as they could in case they were acting on the line in the same direction), and it is manifest that their tendency is to produce a motion of rotation. The arm of the couple is the perpendicular distance between the lines of action of the two forces, and the moment of the couple is the product of one force by the arm. The moment expresses the power of the couple to produce rotation.

CRANIUM. [See p. 177.] There are twenty-one bones in the human skull, eight of which compose the brain capsule, and thirteen the facial portion. Where the breadth bears to the length a less proportion than 75 to 100, the skull is classed as dolicocephalous, and where the proportion is greater than 75 to 100 it is styled brachycephalous. Three distinct races of men, recognisable by their skulls, successively inhabited Europe during the Quaternary epoch. Other races may also have existed, but if so, no trace of them has hitherto been found. Anthropologists endeavour to ascertain the differences between the skulls of various races of men, the most important point being the cubic capacity of the great cavity containing the brain. Many methods have been devised, but none are entirely satisfactory. The ratio of the cubic capacity of the female skull to that of the male skull in persons of English race was found to be 854 to 1000. The average cubic capacity of the skulls of the Australian aborigines was 1283 centimetres, of the Andamanese, 1220 centimetres; Hindoos, 1306; lower grades of English, 1542; a very large but normal skull, 2075. It is generally thought that persons of high intellect have large skulls, and that the majority of criminals and persons of dull minds, have skulls of small capacity; but experience shows that large skulls do not necessarily imply vigorous understanding, and it is clear that the relations between brain capacity and mental power are rather complicated. One of the skulls of largest capacity hitherto measured belonged to a French guillotined murderer, but the size of this skull is said to have been 'evidently pathological.'

CRYPTOGAMIA (*kruptos*, secret; *gamos*, marriage: *Gr.*), in Botany, the lowest division of the vegetable kingdom, comprising ALGÆ, FUNGI, LICHENS, MOSSES, FERNS, and still more humble forms of vegetation. The plants falling into this division are destitute of flowers, and do not possess either a pistil or true pollen. Cryptogamia are thus distinguished from phanerogamous plants or those possessing stamens and pistils. Their mode of propagation is various. In some of the higher tribes there are reproductive organs known as antheridia and archegonia, the former of which emit antherozoids, and by the union of these with the archegonia, new plants are formed. Other tribes throw off little buds, each of which produces a new plant. [See HEPATICÆ (*St.*).] In the lowest tribes the propagation is by cell division. But throughout the whole series no true embryo similar to that of phanerogamous plants can be found. When spores are produced, germination takes place from any part of its surface, without the appearance of cotyledons, and hence these plants are styled acotyledonous. The majority of cryptogams are of cellular structure, but the ferns and club-mosses possess vascular bundles, and true spiral cells occur amongst the mosses. The largest terrestrial members of the cryptogamia are the Tree-ferns, some of which have trunks fifty feet high, strengthened by abundant vascular bundles.

CULTUS (*Lat.*), the worship of a Deity.

CURD, the principal constituent of milk held in solution by a slightly alkaline liquid. As thrown down in the process of cheese making by rennet or an infusion of the stomach of the calf, the coagulated matter or curd is separated from the yellowish liquid called whey. This coagulum contains the CASEIN of the milk, most of the fat, and most of the inorganic matter, chiefly phosphate of lime and sulphur, whilst the whey retains the sugar and soluble salts. [See MILK.]

CURIA, in Roman Antiquity, an edifice in which the senate held its consultations, or a place for the assembly of high councils in provincial cities; also a structure built for the religious services of the curial wards. [See p. 186.]

CYCLONIC (*kuklos*, a circle: *Gr.*), a term applied by meteorologists to a region on the earth's surface where the pressure of the atmosphere is relatively low; whilst anti-cyclonic denotes a region of relatively high pressure. The place or district where the mercury stands lower than at the places around it is the centre of a cyclonic area. On the other hand, if the mercury is higher at a given place or district than at the surrounding places, that place is the centre of an anti-cyclonic area.

CYNOCEPHALUS (*kuon*, dog; *kephale*, head: *Gr.*), a genus or tribe of large apes, containing the baboon, mandrill, and others, which have a muzzle resembling that of the dog, with a great development of the face and jaws. They live in troops, and are nearly confined to the continent of Africa. The mandrill is the largest of the tribe and is remarkable for the bright colours of its face, and the enormous protuberances of its cheeks. Figures of the dog-faced apes appear amongst the hieroglyphics on Egyptian monuments.

CYPERACEÆ, in Botany, the order of Sedges, grass-like plants divided into many genera, of which the principal are Cyperus and Carex. To the former belongs the PAPYRUS. The flowers of the Cyperaceæ are in scaly spikes, the stems are without joints, and are frequently angular. They are of very little value as fodder for cattle, but some of the species, as the Rush Nut, *Cyperus esculentus*, have tubers attached to their roots which are edible. The Cotton Grass, *Eriophorum angustifolium*, a plant growing in bogs in this country, and the Bulrush, *Scirpus lacustris*, belong to the order. Perhaps the finest species in the order is *Cyperus dives*, a native of Abyssinia, which grows to the height of nine or ten feet, and has leaves from one to two yards long.

CYPRIOTE, anything pertaining to the island of Cyprus. The ancient Cypriote inscriptions are in the Greek language, but are difficult to decipher, in consequence of having been cut in a syllabic character. Very interesting Cypriote antiquities in pottery, glass, and precious metal have been discovered.

D

DADO, in Architecture, the body of a pedestal between the base mouldings and the cornice; also any ornamental arrangement round a room on the lower part of the wall, such as wainscoting.

DAGOPAS, ancient bell-shaped buildings in Ceylon, erected to hold sacred Buddhist relics. They are often more than 200 feet high.

DAIMIOS, the great princes of Japan, who until lately had great power in the empire. A Daimio was at the head of each of the small states into which the country was divided. He levied taxes, made the law, and had his own army. There were 620 feudal nobles at that time in Japan, who had 200,000 armed retainers in their pay. When the Shogunate, or authority of the Tycoon, was abolished by the Mikado, the Daimios resigned their fiefs into his hands, and since 1871 the whole authority has been vested in the MIKADO.

DARWINISM. [See EVOLUTION and NATURAL SELECTION.]

DAVYUM, a metal discovered in 1877 by Sergius Kern in ores of platinum, and named by him after Sir Humphry Davy. It belongs to the platinum group – melts at 24° C., has a specific gravity of 9·38, and its equivalent is about 150—154.

DIFFRACTION GRATING, a plane piece of glass or speculum metal, ruled with fine parallel lines, and employed instead of a glass prism to obtain a solar spectrum by reflection. By means of a special apparatus a diffraction grating has been ruled with 17,300 lines to the inch.

DIMORPHISM (*dis*, double; *morphe*, form: *Gr.*), in Natural History, the property in a species of having two forms, *i.e.*, variations in some particulars of structure. [See PRIMULACEÆ (*St.*) for an example.]

DINOSAURIA (*deinos*, wonderful; *saura*, a lizard: *Gr.*), a group of gigantic fossil reptiles found in strata of secondary age, extending from the Lias to the Wealden. They have been divided into three families, represented by the Megalosaurus, Hyælosaurus, and Iguanodon. Their remains possess certain bird-like characters which help to bridge over the interval between the reptiles and birds.

DIOPTASE (*dia*, through; *optazein*, to see: *Gr.*), a rare mineral composed of silicate of copper found in crystals and small amorphous masses of an emerald green colour in Siberia and the Duchy of Nassau.

DIORITE (*dioros*, anything that separates: *Gr.*), in Geology, an igneous rock, often found as a dividing dyke, composed essentially of hornblende, amphibole, and Labrador felspar. It has a granular texture.

DISCOBOLUS (*discobolos*, a quoit player: *Gr.*), in ancient Art, the statue of a man in the act of flinging a quoit. The ancient Greek sculptor, Myron, was celebrated for his Discoboli.

DOLDRUMS, the name given by sailors to the region of CALMS (*St.*) at the equator.

DOLERITE, a variety of basalt with a crystalline and vitreous fracture. It is composed of augite and Labrador felspar.

DOLMEN, in Archæology, a prehistoric tomb made of two large slabs of stone set opposite to one another on edge, with a third slab laid flat on the top. Such rude structures were formerly called Druid's altars. If there is only a single upright stone supporting one end of the capstone whilst the other rests on the ground, this has been styled a demi-dolmen.

DOSSAL (*dos*, the back: *Fr.*), a screen of ornamental wood-work, or the decorated back of an altar or chair. In the case of an altar it is sometimes covered with embroidery or tapestry.

DURIAN (*duri*, a spine: *Malay*), the fruit of a tall tree, *Durio zibethinus*, nat. order *Sterculiaceæ*, growing on the Malay peninsula, in Borneo, and other islands. The leathery skin, covered with spines, encloses a straw-coloured custard-like pulp in which large seeds are embedded. Those who live on the spot think the fruit extremely delicious, but persons who taste it for the first time are offended with its disagreeable smell. A. R. Wallace declares that it affords 'a new sensation worth a journey to the East to experience;' and another traveller speaks of it as the best of all fruits with the worst of characters.

DYNAMITE (*dunamis*, force: *Gr.*), is a mechanical mixture of NITRO-GLYCERINE (*St.*) with matters in the state of powder, such as infusorial earth, chalk, &c. It has a high explosive power, about four times that of gunpowder. It is much safer to handle and transport than nitro-glycerine, but still very great care has to be exercised in its management. When employed for blasting purposes it is usually exploded by means of a copper cap containing a few grains of a fulminate, and this is fired by a fuse or by an electric wire. [See TORPEDO (*St.*).]

E

EBIONITES, a sect of Jews who, whilst maintaining that Christ was a man inspired by God to declare his will, insisted upon the obligation of the Law. They are supposed to have lived in the second century.

EBONITE. [See CAOUTCHOUC.]

ECHIDNA (*Gr.*), a genus of monotreme animals living in Australia, of which only one species, *E. hystrix*, is known. It is two or three times larger than our hedgehog. The back is covered with spines, and it can roll itself up as a ball like a hedgehog. The mouth is furnished with a beak. The legs are short, and have clawed feet, fitted for digging. Its habits are sluggish, spending the greater part of its life in its burrow. Ants are its principal food.

EDELWEISS (*edel*, precious; *weiss*, white: *Ger.*), an interesting plant covered with white down, growing on the mountains of Central Europe. It is the *Leontopodium alpinum* (or *Gnaphalium leontopodium*) of botanists, nat. order *Compositæ*, and may be classed amongst the Everlastings. There has been such a reckless destruction of this somewhat rare plant by the natives of some parts of the Alps for the purpose of selling it to strangers, that a fine has been imposed upon every one selling it in the living state.

EDENTATA (*e*, without; *dentes*, teeth: *Lat.*), a name not very happily chosen for an order of mammals, seeing that several of the animals belonging to it possess teeth. The ant-eaters, sloths, and the monotremes of Australia are placed here. Teeth when present are never incisive, and are always one-fanged.

EDITIO PRINCEPS, in Bibliography, the finest edition of an old author's works.

EFFENDI, amongst the Turks, a title given to official persons and those of some position. The minister of foreign affairs at the Porte is styled Reis-Effendi.

ELAND, one of the antelopes of the Cape of Good Hope; the *Oreus canna* of zoologists. It is about five feet high and eight feet long. It has been introduced into some English parks, as it stands our climate well. The flesh is much prized by the colonists.

ELECTRIC LIGHT. [See p. 239.] The application of electricity for the purpose of obtaining a light which should supersede lighting by gas is a problem the solution of which has been frequently attempted. In the session of 1879 the House of Commons appointed a committee to consider certain questions connected with this subject, and as their report gives an interesting summary of the present position of the matter, the following passages are printed here:—'It is an evolution of scientific discovery which has been in active progress during the whole of this century. Essentially the electric light is produced by the transformation of energy either through chemical or mechanical means. The energy may be derived from a natural force, as, for instance, a waterfall, or through combustion of a material in the cells of a voltaic battery, or of fuel in a furnace. The energy being converted into an electric current, may be used to manifest electric light by passing between carbon points or by rendering incandescent solid bodies, such as iridium. A remarkable feature of the electric light is that it produces a transformation of energy in a singularly complete manner. Thus the energy of one horse-power may be converted into gaslight, and yields a luminosity equal to 12 candle-power. But the same amount of energy transformed into electric light produces 1600 candle-power. It is not, therefore, surprising that while many practical witnesses see serious difficulties in the speedy adaptation of the electric light to useful purposes of illumination, the scientific witnesses see in this economy of force the means of great industrial development, and believe that in the future it is destined to take a leading part in public and private illumination. There is one point on which all witnesses concurred, that its use would produce little of that vitiated air which is largely formed by the products of combustion of ordinary illuminants. Scientific witnesses also considered that in the future the electric current might be extensively used to transmit power as well as light to considerable distances, so that the power applied to mechanical purposes during the day might be made available for light during the night. So far as the practical application of the electric light has already gone, there seems to be no reason to doubt that it has established itself for lighthouse illumination, and is fitted to illumine large symmetrical places, such as squares, public halls, railway stations, and workshops. It is used in Paris for lighting shops which require a light by which different colours may be distinguished, and has recently been used in England for the same purpose with satisfactory results. Many trials have been made for street illumination with greater or less success. Compared with gas, the economy for equal illumination does not yet appear to be conclusively established. Although in some cases the relative economy for equal candle-power is on the side of the electric light, yet in other cases gas illumination of equal intensity has the advantage. Unquestionably the electric light has not made that progress which would enable it in its present condition to enter into general competition with gas for the ordinary purposes of domestic supply. In large establishments the motors necessary to produce the electric light may be readily provided, but, so far as we have received evidence, no system of central origin and distribution suitable to houses of moderate size has hitherto been established.'

ELECTRIC TELEGRAPH. One of the recent inventions connected with this subject is Cowper's Writing Telegraph. This consists of a combined transmitting and receiving instrument at each station, so that messages can be sent in either direction. The principle of the invention is described to be the communicating to a writing pen placed on the recording instrument the exact position of a pencil used by the operator at the transmitting instrument by means of two line wires, the vertical position of the pencil being communicated by one, and its horizontal position by the other. Each of these wires actuates its own needle, and these needles are so arranged that they actuate a writing pen to which ink is constantly supplied. The pen moves up or down, backwards or forwards, in exact obedience to the motions of the pencil, which is guided by the operator at the transmitting instrument. The message is written by the sender on a strip or riband of paper which passes under his hand, being unwound by clockwork. The message is produced by the pen at the receiving station on a slightly smaller scale than in the pencil original, but in other respects in precisely the same characters and style of handwriting, upon a similar riband of paper moved under the pen by clockwork. The message, when completed at the receiving station, is cut off and sent to its destination, whilst that at the transmitting end can be preserved as a record.

ELECTRODES (*odos*, a path: *Gr.*), the poles of a galvanic battery. Faraday termed the positive pole the *anode* (*ana*, through: *Gr.*), and the negative pole the *cathode* (*kata*, in opposition to: *Gr.*). In a cell of zinc and copper, for example, the copper plate forms the anode, the zinc plate the cathode. If the currents are conveyed by wires out of the battery, the terminals of the wires form the electrodes.

ELECTROLYTE, the substance decomposed or electrolysed in the process of ELECTROLYSIS. [See p. 241.]

ELECTROPLATING, ELECTRO-GILDING, a process for covering an article formed of some common metal with a thin coat of silver or gold. This is an example of ELECTROLYSIS, a salt of one of the precious metals being decomposed by the action of a galvanic battery. The article intended to be coated is made the negative ELECTRODE (*St.*), and a plate of silver or gold forms the positive electrode. Both electrodes are immersed in a bath consisting of a solution of the salt, and the precious metal is deposited upon the article as the salt undergoes decomposition on the passage of an electrical current.

ELEMENTARY BODIES. Chemists now teach that what are commonly styled elements are not necessarily simple bodies, but only bodies which have not hitherto been decomposed. Mr. Lockyer states that some of them, when examined spectroscopically, exhibit phenomena which lend support to the hypothesis that they are compound. The following new elements have been added of late years to the list given on p. 259. Like Cæsium, Rubidium, Thallium and Indium, they have been discovered by the method of spectrum analysis.

	Equiv	*Sp. Grav.*
Davyum . .	150–154	9·38
Decipium . .	106	...
Philippium . .	74	...
Norwegium . .	145	9·44
Samarium . .	...	...

ELVAN, the Cornish name of a granitic porphyry appearing in the form of dykes.

EMERITUS (one who has served out his time: *Lat.*), a term often applied to retired professors in a university.

EMISSARY (*emissarium*: *Lat.*), the outlet or drain of a lake.

EMPIRICISM (*empeirikos*, experimental: *Gr.*), in Philosophy, the doctrine that all our knowledge is entirely derived from experience.

ENCEPHALON (*en*, in; *kephalaion*, the head: *Gr.*), the contents of the head, namely, the brain.

ENCHORIAL. [See HIEROGLYPHICS.]

ENCYCLIC LETTER (*kuklikos*, circular: *Gr.*), a term usually applied to the letters which the Pope sends to all the bishops on matters affecting the whole Church.

ENDOCHROME (*endon*, within; *chroma*, colour: *Gr.*), in Botany, the contents of the cells in the order of Algæ. The matter is frequently coloured.

EPIGRAPHY (*epi*, upon; *graphe*, writing: *Gr.*), the study of ancient inscriptions or epigrammata.

EPITHEMIUM (*epithema*, a cover: *Gr.*), a term applied by anatomists to the lining of the internal cavities of the body. It consists of cells of various forms in different parts so connected as to form a delicate membrane answering to the skin of the outer surface of the body. The epithelial cells of the respiratory tract and some other parts carry minute hair-like appendages called cilia.

EPONYM (*eponumos*, an epithet for that which gives its name to something: *Gr.*). In ancient Athens the first of the annually elected archons gave his name to his year of office, and he was therefore styled the eponymous archon. A great number of inscriptions lately discovered amongst Assyrian ruins are dated with the name of an officer called *limu*, who held office for a year. Hence the records thus dated are styled eponymous.

EQUATORIAL INSTRUMENT, in Astronomical Observatories, a telescope mounted in such a way as to be capable of motion in two planes at right angles to each other, the amount of angular motion in each being measured in two circles coordinate to each other, whose planes are parallel to those on which the telescope moves. The principal axis of the mounting is made parallel to the earth's axis, and therefore points to the poles of the heavens. The plane of one of the circles is thus parallel to the earth's equator, and by its divisions can be measured hour angles or differences of right ascension. The telescope is attached to the other circle, which being made to rotate round the principal axis of the mounting, will correspond in its various positions to great circles in the heavens. These being hour circles, declinations or polar distances or their differences can be measured by the graduated circle.

EQUILIBRIUM. A body resting on a horizontal plane is in a state of equilibrium when the vertical through the centre of gravity falls within the figure drawn through its points of support. If a body is capable of turning about an axis or a fixed point, the equilibrium is said to be stable when the centre of gravity is below, and unstable when the centre of gravity is above, the axis or point of suspension. In the case of a body resting on a horizontal plane, which it touches only at one point, thus to ensure equilibrium, it is necessary that the vertical through the centre of gravity should meet the plane at the point of contact, and to ensure stable equilibrium, it is necessary that the centre of gravity should occupy the lowest possible position.

ERASTIAN, a term applied to those persons who think that the Church should be under the control of the State. Erastus was a German divine, born 1524, who taught that the punishment for offences whether civil or religious, should be awarded and carried out by the civil magistrate.

EROSION (*erosio*, an eating away: *Lat.*), a term applied by geologists to the destruction of land near a river by the flowing water, or to that of a coast by the sea, or to the waste of land by rain. Valleys of erosion are those that have been formed by running water.

ERRATIC BLOCKS, in Geology, are blocks of stone which have been brought from a distance by natural causes, and deposited on the surface of a country. The structure of the stone frequently enables an observer to discover the spot whence they have been transported, sometimes hundreds of miles distant. The agency of transport is supposed to have been in some cases glaciers, at others floating ice when the land was at a lower level than at the present day.

ESCHATOLOGY (*eschatos*, the last; *logos*, a discourse: *Gr.*), in Theology, the doctrine concerning the resurrection, final judgment, and what are called the last things.

EVOLUTION, in Natural History, the doctrine which teaches that all existing forms of organised beings, both vegetable and animal, have been gradually developed from simpler forms through the ages of the past. Lamarck and others put forward doctrines of this nature, but the form in which it is now widely accepted is due to Mr. Darwin.

EX VOTO (according to a vow: *Lat.*), an offering made by a grateful devotee for restoration from sickness or preservation from danger. In ancient times the temples of the gods were hung with offerings which took various shapes, legs, arms, ears, &c., in terra-cotta or other material, just as at this day may be seen the wax models and pictures round the altars of popular saints in Roman Catholic countries.

F

FALUNS, a name given to beds of sand and marl containing fossil shells and corals, found in patches in the north-west of France (Dinan, Nantes, Tours). About two-thirds of the shells are extinct, and these beds have therefore been assigned to the Miocene Tertiary epoch. Remains of mastodon, rhinoceros, hippopotamus, and other terrestrial quadrupeds, as well as of cetacea, are here and there intermixed. The name Faluns has passed into geology.

FAYENCE (*Fr.*), a general name given to ornamental pottery excluding porcelain, but rather loosely employed. The name is derived from the town of Faenza, in Italy, once celebrated for its manufacture of fine earthenware.

FELLAH, *pl.* FELLAHIN (a cultivator of the soil: *Arabic*), the peasants of the Nile valley, the descendants of the ancient Egyptians; and their language, the Coptic, is the modern form of the old Egyptian. They strikingly resemble the figures on the old monuments.

FETISHISM (*feitico*, sorcery: *Port.*), that primitive belief which assigns consciousness and volition to all objects that come into contact with human sense. Trees, stones, mountains, sun, moon, and stars are endowed in man's ignorance with those attributes of life and thought which he feels within himself, and some of them, in obedience to his superstitious tendencies, are selected for rude worship.

FERNS, TREE [See p. 279.] More than 200 species of tree ferns are known to botanists, who distribute them among many genera Some species attain the height of fifty feet, with a trunk having a thickness of one foot. Others do not exceed the height of three or four feet, with a trunk one inch thick The real diameter of the trunk is often much increased by the bases of dead leaf stalks (stipes), and by a matted mass of aerial roots. They are widely distributed either on mountains within the tropics, or in the extra tropical islands of the southern hemisphere. Tree ferns are of little use to man. In the Sandwich Islands are some species of *Cibotium* which have the bases of their leaf stalks clothed with an abundance of delicate brown silky hairs This is gathered and exported to California, where it is employed as a material for stuffing cushions The BAROMETZ or Vegetable Lamb of fable, is the decumbent stem of a tree fern, *Cibotium barometz*, which is densely clothed with silky hairs Several species of tree ferns are cultivated in the conservatories of this country, belonging principally to the genera *Alsophila*, *Cyathea*, and *Dicksonia*.

FEZ a tall red hat without a brim, worn by the Turks. It is so called from Fez, in Morocco, one of the places of its manufacture.

FILARIA (*filum*, a thread· *Lat*), a genus of Nematoid worms with long filiform bodies. Two species occur under the leaves of plants growing in fresh water. Another species is the Guinea worm which infests the natives of Africa, Arabia, and India. It penetrates the skin and raises a tumour. Other species have been found in the bronchial tubes of man, the lachrymal gland, and the eye; even in the blood of man there has been detected a very minute species.

FILAR MICROMETER, a micrometer for an astronomical telescope formed of very fine wires, or of the most delicate spider's threads (*fila*. *Lat.*) that can be procured.

FINIAL (*finis*, the end: *Lat.*), in Architecture, the terminating ornament of a pinacle, canopy, &c

FLAMBOYANT STYLE, in Architecture, the highly decorated style of Gothic which prevailed in France at the time the PERPENDICULAR was practised in England. The tracery of the windows, panels, &c., is wavy, and the ornamentation lavish. The French word *flamboyant* signifies flaming.

FLAX, NEW ZEALAND, the *Phormium tenax* of botanists, nat. order *Liliaceæ*. This handsome plant is quite different in appearance and natural position from the common flax plant of Europe Its flat leaves, which grow directly from the root, are from five to ten feet long, and three inches broad. They abound with long fibres, affording good material for cordage, as well as a finer material for textile manufactures The principal difficulty in their preparation arises from their gummy juice. The plants form large tufts, and afforded excellent hiding places for the Maoris when they were at war with the colonists.

FLUORESCENCE. When certain bodies (for example, a solution of sulphate of quinine) are viewed by transmitted light, they appear colourless, but when viewed in reflected light they have a peculiar self luminous appearance. This property has been termed fluorescence, as it was first observed in fluor spar. The property is well seen in canary glass coloured with oxide of uranium, when placed in the ultra-violet portion of the solar spectrum Fluorescence is believed to be essentially identical with phosphorescence. Many bodies have been found to possess the power of absorbing dark rays of high refrangibility, and of emitting them as luminous rays of lower refrangibility, or, as it has been said, of absorbing darkness and of giving it forth as light. Thus, if certain substances are subjected to the action of the invisible ultra-violet rays of the solar spectrum, they become luminous.

FLY WHEEL, in machinery, a large wheel with a heavy rim attached to the shaft of a steam-engine for the purpose of rendering the motion uniform. This it effects by absorbing the surplus force at one part of the action and giving it out when the action is deficient, the 'dead points' being thus nullified.

FOG HORN, an instrument for sending a sound to a considerable distance through a fog for the purpose of warning against danger Experiments have shown that whistles and bells are not sufficiently effective. Sound reflectors are of little value because the rays of sound do not, like those of light, move parallel to each other from the surface of a concave reflector, but constantly diverge laterally to all sides, and although at first the sound is more intense in the axis of the reflector, it finally spreads out in all directions. It has been found that fog signals can be best transmitted by horns constructed on the principle of the REED PIPE, the sound of which can be heard at a distance of three miles.

FOLK-LORE, a term applied to a collection of local traditions, superstitions, legendary stories and ballads, proverbial sayings, old customs, and other kindred matters exemplifying the ideas, impressions, and tastes prevalent among the common people Scientifically treated the study of folk lore is a branch of anthropology There is a Folk Lore Society in London

FOLLICLE (*folliculus* a little bag *Lat*) in Botany, an elongate seed vessel something like a pod containing several seeds and opening by the ventral suture whereas the pod opens both dorsally and ventrally The seed vessels of the lark spur and hellebore are follicles

FOOT POUND, the unit measure in this country of mechanical work Thus 100 foot pounds of work signifies that an effort has been exerted equivalent to raising 100 pounds one foot high or one pound 100 feet high The unit measure in France is the mètre kilogramme

FRIGIDARIUM (*Lat*) the room in a Roman bath where the bathers remained to cool themselves after having had a hot bath

FRONDE, the name of a party in France, which, during the minority of Louis XIV, opposed the absolutist politics of Cardinal Mazarin and caused great disturbances (1648 1652) It was headed by the great nobility and the Parliament later by the Prince de Condé The term is derived from the French word *fronder*, to blame, to ridicule

FUEROS (*Spanish*), the old privileges of the two Spanish provinces, Biscay and Navarre lately abolished They consisted chiefly of a special exemption from the duty of contributing soldiers for the defence of the kingdom, and from all except local taxation

FULGURITE (*fulgur* lightning *Lat*), a tube formed by lightning when it strikes a mass of sand The walls are of vitrified sand A fulgurite is usually sinuous and branched, and it ends in a point

G

GALLIUM (*Gallia*, France *Lat*) a silvery white metal discovered in 1875 by Lecoq de Boisbaudran existing in minute quantities amongst zinc ore obtained in the Pyrenees It is hard, slightly malleable but very fusible, melting with the heat of the hand at 86° F When once melted at that temperature it may be cooled down to the freezing point of water without solidifying and may be kept in the liquid state for several months The two states form a hydro electric couple, the solid metal being the positive element Its specific gravity is 4 7 its equivalent 69 8

GAMBIER, or *Terra Japonica* a brown substance used for tanning and dyeing purposes, like Cutch or Catechu, and imported from the Straits of Malacca It is obtained from a climbing shrub the *Uncaria Gambir* of botanists (nat order *Cinchonaceae*) by boiling the leaves and young shoots The plant has hooked spines and its name is derived from the Latin word *uncus* a hook

GANISTER, the Yorkshire name of the lower coal measures They contain beds of a fire clay which is largely employed as a material for lining iron smelting furnaces which material has also received the name of ganister

GARGOYLE or **GURGOYLE**, in Gothic Architecture, a projecting spout to throw off water from a roof It is often carved into a grotesque form, such as the gaping head of a man or animal, hence the name through the French *gargouille* a spout, from *gurgulio* the throat *Lat*

GASES LIQUEFACTION OF Up to the year 1878 all the gaseous forms of matter had been reduced to a liquid state except only oxygen nitrogen and hydrogen which had resisted all attempts to liquefy them and hence had acquired the name of permanent gases But in December of that year M Raoul Pictet of Geneva and M Cailletet of Paris succeeded in showing that they also might be liquefied By applying a pressure of from 200 to 280 atmospheres and at the same time reducing the temperature to 300° C below zero each gas was separately liquefied (hydrogen, however, only showing itself as a vapoury cloud) and then atmospheric air (a mixture of oxygen and nitrogen) was also brought to a liquid state by similar treatment If a suitable degree of pressure and cold could be applied no doubt these gases would be made to appear as solids although this may never be actually done

GASTEROPODA (*gaster* belly *pous*, foot *Gr*) the typical class of the Mollusca including land and sea snails, whelks limpets &c They exhibit considerable variety of form some being coiled into a spiral others of an elongate shape but nearly all crawl on a flat disc on the under side of the body called a foot Some are protected by shells, others are destitute of shells The great majority of the univalve shells in the cabinet of conchologists have belonged to

Gasteropoda. There are two natural groups, in one of which the animals breathe air, in the other aërated water, the latter undergoing a metamorphosis in the young state, whilst the water breathers have always the same shape.

GASTRÆA. A theory has been propounded by Professor Haeckel as to a primitive animal form called by him Gastræa (*gaster*, a stomach: *Gr.*), from which all animals higher than the PROTOZOA are supposed to have descended. By the repeated division of the original germ cell a layer of cells resulted which took the shape of a round ball filled with liquid. A depression showed itself at one point, which gradually deepened until one half the ball was inverted inside the other, the mouth of the cup or hollow thus formed being narrowed so that there was now another ball of two layers of cells with an orifice leading into the interior stomach. This is the *gastrula* (a little stomach), which, being furnished with vibratile hairs and other appendages, constitutes the gastræa or primitive intestinal animal. From this simple form developed in one direction the zoophytes, in another the worms, and from the latter the vertebrate class ultimately proceeded.

GATLING GUN, a gun with several barrels, and furnished with a rotating drum, by means of which it can be rapidly loaded and discharged, so that a great number of shots can be fired in a minute.

GERM THEORY of Disease. [See BACTERIA (*S.*).]

GESTA (achievements: *Lat.*), a word employed by mediæval writers in describing the exploits of warriors, knights errant, and other worthies. In English it became Gestes, which was used in opposition to the Dictes or Seyinges of the Philosophres.

GRAAL, THE HOLY, a superstition of the Middle Ages relating to the cup (*grasal: Old French*) from which the Son of Man drank at the Last Supper. This, it was said, was filled by Joseph of Arimathea with the blood that flowed from His wounds, and thereby acquired miraculous virtues. The Sangreal was then lost, and the search for it was undertaken by the Knights of the Round Table. It was found by Perceval, and at his death was carried up to heaven.

GRASSES. [See p. 326.] To this family belong the Pampas Grass (*Gynerium argenteum*), much cultivated in English gardens on account of its large handsome spikes of silvery flowers; the Guinea Grass (*Panicum maximum*), which grows in tufts, and is sometimes cultivated for fodder; the Canary Grass (*Phalaris Canariensis*), cultivated for its seeds, the food of cage birds; Tussac Grass (*Dactylis cespitosa*), a native of the Falkland Islands. The BAMBOOS are gigantic species of this family.

GREGORIAN CHANT, plain chant or plain song, the few notes to which the words of the Liturgies are recited in Roman Catholic Churches. Something of the sort was very early in use by ecclesiastics, but it took the name of St. Gregory from his having compiled from existing chants a ritual book of music or antiphonarium.

GUAIACUM, the name of a resin often called Gum Guaiacum, employed in pharmacy and obtained from a tree growing in the West Indies, *Guaiacum officinale*, nat. order *Zygophyllaceæ*. The wood of this tree is so hard and heavy that it sinks in water. It is imported into this country under the name of Brazil Wood and Lignum Vitæ, being in request for articles of turnery.

GUN COTTON, a preparation of cotton which has come into use of late years as a substitute for gunpowder for explosive purposes. Its properties were discovered by Schoenbein, the chemist of Basle, in 1846. It is prepared by steeping cotton in a mixture of sulphuric and nitric acids. It is then washed, and treated so as to get rid of the acids. When dried it is ready for use. The greatest care must be taken in preparing and storing it, and even then disastrous explosions have occurred. Gun cotton explodes at a temperature of 277° F.; percussion will also cause it to explode. Its combustion takes place with great rapidity, and its propelling power is three times that of gunpowder, weight for weight. Collodion is made from gun cotton by dissolving it in a mixture of alcohol and ether.

GUTTÆ (drops: *Lat.*), in Architecture, ornaments shaped something like drops placed below the triglyphs of the frieze in the Doric order.

GYMNASIUM (*gumnasion: Gr.*). In Germany and France the higher schools for boys before proceeding to the universities are styled gymnasia and gymnases.

H

HÆMOPTYSIS (*aima*, blood; *ptusis*, a spitting: *Gr.*), the coughing up of blood from the lungs, a symptom which should induce the patient to seek the advice of a medical man at once.

HALTERES, in Entomology, two small appendages, one attached at each side of the metathorax, behind the wings in insects of the order Diptera. They may be plainly seen in the common housefly.

They vary a good deal in form and their use is not well known, their name is taken from the Latin word *halteres*, the pieces of load which a person carried in his hands to balance himself when performing gymnastic exercises

HAMITIC (Ham, the son of Noah), a term applied to the ancient Egyptian, the modern form of it called Coptic, and other kindred African languages

HANAP (*hnæp*. *Ang Sax*), a cup or goblet

HARA KIRU, the Japanese punishment, which a condemned man carries out by ripping himself up with a knife

HARMONIUM a musical instrument with a keyboard like that of a pianoforte The sounds are produced not by a hammer striking upon wires but by wind from a bellows worked by the feet driven through REED PIPES (*St*)

HARMONY PRE ESTABLISHED a theory put forward by the German philosopher Leibnitz, to explain the apparent action of body upon mind in the individual It was laid down as an axiom that only like could act upon like, and as body and mind are unlike, it was asked, how did the former act on the latter? Leibnitz answered that the human body and the human mind are independent, but corresponding machines They were adjusted as two separate clocks may be, one to strike the hour, and the other to point to it

HEDONISM (*hedone* pleasure *Gr*), the doctrine that the great aim of life is to seek pleasurable emotions and avoid painful ones

HEGEMONY (*hegemonia* *Gr*) the supremacy conferred on one of several States of ancient Greece when confederated for war In modern Germany hegemony is enjoyed by Prussia

HELIOGRAPH (*helios*, the sun *graphein* to write *Gr*), an apparatus for transmitting signals by the reflection of the suns rays It consists of a mirror adjusted to mechanism, which causes the reflected rays to continue to reach the same distant point notwithstanding the suns motion By pressing a key the flashes can be made to differ in duration so as to indicate letters or words according to a given code Signals, it is said, can be read by it as far as 80 or 100 miles

HELIOGRAPHIC POSITION in Astronomy, the solar latitude and longitude of an object seen on the suns face

HELIOSTAT (*helios*, the sun *states* standing *Gr*) an apparatus consisting of a mirror made to reflect the suns rays to a distant point and worked in connection with a combination of telescopes It is employed in surveying for the purpose of laying down angles Triangles with sides of more than 100 miles in length, have been accurately laid down by its aid.

HELIOTROPE (*helios*, the sun, *trophe*, a turning *Gr*) in Surveying, an instrument for reflecting a ray of light from one station to another

HELIX (a whorl *Gr*), in Electrical Science a coil of insulated copper wire enveloping a magnet or iron core

HENRI DEUX WARE a white earthenware of great rarity made in France in the time of Henry II Its slight ornamentation was produced by indenting the soft paste with an iron tool and filling the indents with paste of a different colour

HEPATICÆ (*hepar*, the liver *Lat*), in Botany, a group of cryptogamous plants containing several tribes or orders The best known plants are called Liverworts and have broad fronds which creep on the ground in damp places Others, more like mosses, are found on rocks and trees Besides propagation by antheridia (with antherozoids), and archegonia, several species throw off little green buds each of which will produce a plant Hepaticæ are of no known use, though formerly some of the liverwort section were administered in cases of liver disease.

HERMÆ in Ancient Sculpture, short angular pillars with a head at the top They were set up at the sides of roads and derived their designation from the god Hermes the Mercury of the Romans, whose bust was frequently upon them

HERRING [See p 348] This fish is found in four conditions —(1) the fry or sill (2) maties or fat herring, (3) the full herring (4) the shotten or spent herring Yarrell thought that the fish takes about eighteen months to reach its full size and maturity but it is probable that it reaches its spawning condition in about a year that the eggs are hatched in two or three weeks after they have been deposited and that in six or seven weeks they have attained three inches in length The maties or fat herring become full herrings in three or four months The full herring appears at first here and there among the shoals but gradually increases in number until it largely preponderates over the maties The herrings then collect in prodigious numbers, in places suitable for the deposit of the spawn Here they lie in tiers covering several square miles of sea bottom After spawning they withdraw as spent herrings into deep water There are two spawning seasons the spring (February and March), and autumn (August and September), but it is not likely that the same fish spawns twice a year and it is thought more probable that the spring and autumn shoals are distinct The food of the herring consists of small crustacea and small fish. In the matie or fat condition they feed voraciously The herring has many enemies both amongst its own class and birds. It is calculated that our fishermen take annually 900,000,000, but this number is insignificant compared with that destroyed by the cod and other fishes. It is not uncommon to capture a cod with six or seven herrings in its stomach. Gulls and gannets destroy them by millions.

HERRING BONE WORK, in Mediæval Architecture, masonry or brick work, where the materials were placed angularly instead of flat.

HESPERIDES, in Grecian Mythology, the female guardians of the golden apples given by the Earth to Hera (Juno) on her marriage with Zeus (Jupiter). Different accounts are given as to their number (from three to seven), and as to their parentage, but they derive their name from their supposed mother, Hesperis. Their beautiful garden was placed on Mount Atlas or somewhere in Libya, *i.e.*, North Africa, where they were assisted in their duties by a dragon, which was killed by Hercules when he took possession of the apples.

HEXAPLA (*hexaploos*, six fold: *Gr.*), a work in six languages, especially the Bible when six versions are printed side by side.

HIERATIC (*hieratikos*, sacerdotal: *Gr.*), the character which the ancient Egyptians employed in writing on papyrus, and which may be styled cursive hieroglyphics. Vast numbers of papyri with such writing have been discovered relating to a great variety of topics, fiction, history, scientific and medical treatises, religion, legal proceedings, &c. The style is diffuse, and the characters differ a good deal.

HIMYARITIC INSCRIPTIONS. The Himyarites were a Semitic race who, in the second century of our era, established a powerful state in Southern Arabia (Yemen), but who were overpowered by the Mohammedan Arabs in the eighth century. Inscriptions by them, some of which scholars have deciphered, have been found on rocks and copper plates.

HIPPURITIC LIMESTONE, in Geology, a deposit belonging to the lower division of the Cretaceous epoch, found in the South of Europe, and characterised by extinct shells of a peculiar form belonging to the genera Hippurites, Radiolites, &c.

HONEY GUIDE, a bird belonging to the genus *Indicator*, or the Cuckoo family, which lives in South Africa, and has the habit of guiding the Hottentots to the nests of wild bees by flitting before them and repeating a peculiar cry. The natives have great esteem for their feathered friends, and always leave them a portion of honey as their share of the spoil. — Several species of birds belonging to the order of Passeres have received the name of Honey Suckers from their feeding upon the nectar secreted by flowers. They are found in Australia, the Indian Archipelago and Africa.

HOSPODAR. [See p. 356.] This title has been abandoned, Moldavia and Wallachia having in 1862 united and formed a country called Roumania, under the rule of a prince. With the assistance of Russia the country has thrown off the suzerainty of Turkey and become completely independent.

HOVAS, the principal race in Madagascar. They are of Malayo Polynesian origin, as their physical conformation and language show.

HYDRAULIC MINING, sometimes called Gulch or Placer Mining. In the state of California are thick deposits of gravel and sand, through which particles of gold are disseminated. These are extracted by the following process. A supply of water with head pressure is obtained, and this is made to play through pipes fitted with nozzles upon the vertical or sloping face of the deposit. The gravel is thus washed down into a long sluice through which the water drives it whilst the gold is deposited on the way. In drift mining, which is also carried on in similar deposits, the gravel is dug out with shovels and carried on trucks to a sluice through which water flows and the gold falls out in the course.

HYDROZOA (*hudor*, water; *zoon*, animal: *Gr.*), an order of Zoophytes, usually compound, and living in both fresh and salt water. The compound hydrozoa generally form a polypary, a delicate horny or glass stalk with cups, in each of which lives a single polyp connected by a fleshy thread with the other polyps in the polypary. The polyps can protrude themselves out of the cups or withdraw within, and are usually furnished with tentacles variously disposed. Polyparies of various species are to be seen on every coast resembling patches of whitish moss. The species of Hydra, common in fresh water, attached to plants, has no polypary. It is a minute animal, and an interesting object when living for the microscope.

HYOID BONE, in Anatomy, a bone placed between the root of the tongue and the larynx. It is so called from its shape resembling that of the Greek letter *v*.

HYPÆTHRAL (*hupo*, beneath; *aither*, the air: *Gr.*), in Ancient Architecture, a term applied to those temples which had their cellæ not covered in but exposed to the sky.

HYPOCAUST (*hypocaustum*: *Lat.*), a room in a Roman bath which was heated by a fire underneath the floor.

I

ICON or **IKON** (*eikon*, a representation: *Gr.*). In Russia, a picture or low relief of a saint is placed in almost every room of the houses to stimulate the devotional feelings of the inhabitants. A traveller states that in the ante-chambers of the Exchange at St. Petersburg large pictures are hung up, with lamps suspended in front of them, and before these merchants perform their devotions as they come in or go away. Icons are to be found everywhere, in the public offices, the palaces, museums, railway stations, shops, even in the cabins of ships, and the icon, wherever it may be, is respected.

IDENTITY, sameness, not merely similarity. Memory is the basis of all evidence of identity. We must remember the former appearance and properties of an object before we can say that the one before us is the same. As to Personal Identity the remembrance of former actions, feelings, and thoughts, is the chain by which our present and our past selves are connected into a whole, which has endured with unbroken continuity from moment to moment, from day to day, and from year to year, ever since we possessed consciousness.

INDIANS (*Indiani: Lat.*), the inhabitants of India, a country deriving its name from the river Indus. When America was discovered, the Spaniards, supposing that they had reached the east coast of India, called the natives Indians, and this erroneous name has been perpetuated. Hence also the names of East Indies and West Indies. The American Indians are of the Mongolian race. They are divided into numerous tribes and speak a great variety of tongues or dialects. They are estimated to be about 12,150,000 in number, of which 330,000 live in the United States.

INDIAN SUMMER, a name given in the United States to the mild and serene weather enjoyed in the month of October.

INDICATOR, in Mechanics, an apparatus for showing the pressure of the steam in the cylinder of a steam engine, and for marking its indications on paper, from which can be seen the varying pressure throughout the stroke of the piston.

INDIUM, a soft white metal not tarnishing in the air, discovered in German ores of zinc (blende). It is of rare occurrence, melts at 351.5° F., has a specific gravity of 7.36; chemical equivalent, 75.6.

INDRA, the conqueror, a Hindoo deity; at the period of the Vedas the highest deity, the chief of the gods of the air, but afterwards chief of the nether deities.

IN PARTIBUS INFIDELIUM (in heathen parts: *Lat.*). Bishops appointed by the Pope with this designation have dioceses in countries now possessed by non-Christians, especially in the East.

IN SPIRITUALIBUS (*Lat.*), in spiritual affairs, in opposition to *in temporalibus*, in temporal business. In speaking of the members of the upper house of the British Parliament, we use the phrase, the Lords spiritual and temporal, meaning the bishops and lay peers.

INSTITUTE of FRANCE (*l'Institut de France*), the collective name of the five Academies, which have their seat in a special building at Paris called the Palais de l'Institut. (1.) The French Academy, established in 1635 by Cardinal Richelieu, for the cultivation and advancement of the French language and literature. There are forty members (the Forty Immortals), who still hold sway over language and literature, although the great dictionary they undertook many years ago has made little progress. (2.) The Academy of Inscriptions and Belles Lettres, founded in 1701 for historical, archæological, and philological researches; also with forty members. (3.) The Academy of Sciences, founded by Colbert in 1666; there are eleven sections, with sixty-five members. (4.) The Academy of Fine Arts, founded by the painter Lebrun, in 1648, and remodelled by Colbert in 1664 as the Royal Academy of Painting and Sculpture, with forty members. These four Academies have undergone many changes of constitution and name (Royal, Imperial, National), and in 1803 a new branch was added, which in 1832 became (5.) the Academy of Moral and Political Sciences. The Academicians receive a pension of 1500 francs, and each Academy elects new members to fill vacancies in its body. Every new member of the French Academy is elected into a particular chair, and it is his duty on taking his seat to pronounce a formal harangue on the life and merits of his predecessor in that chair, to which a reply is made by another member.

INSTRUMENTATION, in Music, the artistical arrangement of a piece of music for the various instruments of an orchestra, with special reference to their several powers and peculiarities, and with the view of producing the intended effect. The written music is called the *score*.

INTENSITY OF SOUND. This is synonymous with loudness, and is proportional to the square of the aërial vibra tions in the case of sounds of the same pitch and character.

INTERMEZZO (*Ital.*), an interlude or short musical comedietta serving to fill up the time between two acts of the principal piece.

INTERNUNCIO (*Ital.*), a representative of the Vatican of lower grade than a nuncio at the court of a Roman Catholic sovereign.

INTERPELLATION (*Fr.*), a question addressed in a parliamentary assembly to some member of the Government, with the view of obtaining information as to some occurrence or proceeding. To interpellate is to ask for an explanation.

IRRATIONAL, in Arithmetic, a term applied to a number whose ratio to unity cannot be exactly expressed, an approximation only can be made, but this may be made continually closer. The numerical ratio of the circumference of a circle to the diameter is irrational. The roots of most whole numbers and logarithms are irrational. Such numbers are termed Surds. CIRCULATING DECIMALS are cases of this kind. In Algebra the term is applied to expressions involving fractional indices or radical signs.

IRRATIONALITY OF DISPERSION, in Optics, a term applied to the irregularity of the relative distances of the lines in the prismatic spectrum when prisms of different materials are employed. It arises from the different powers of dispersion possessed by different bodies.

IRVINGITES, a sect of Christians, followers of Edward Irving, who was born at Annan in Scotland in 1792 and died in 1834. They style themselves the Catholic Apostolic Church, believe in the revival of the spiritual gifts of the apostolic times, such as the power of speaking in unknown tongues, and expect an early appearance of the millennium. The church dignitaries are styled apostles, prophets, evangelists, and shepherds; the officers of the congregations are angels, elders, priests, and deacons. The services are conducted with much pomp. This sect has obtained converts among the upper classes in Germany.

ISOBARIC LINES or **ISOBARS** (*isos*, equal, *baros*, weight: *Gr.*), in Meteorology, are the lines drawn on the earth's surface to connect places where the barometer at a given date, or on the mean of the year, indicates the same atmospheric pressure.

ISOCLINAL LINES (*isos*, equal; *klinein*, to bend down: *Gr.*), in Terrestrial Magnetism, are lines which connect places on the earth's surface where the needle has the same inclination.

ISOGONAL LINES (*isos*, equal; *gonos*, an angle: *Gr.*), in Terrestrial Magnetism, are those which are drawn through places on the earth's surface where the declination of the needle is the same, because such lines make the same angle with the meridian.

IVORIES, ancient and mediæval carvings in ivory preserved in museums and much prized by antiquarians. They are usually in the form of statuettes, busts, crucifixes, diptychs, triptychs, and panels. There are many specimens in the British Museum, South Kensington Museum, and Liverpool Museum. The museums in Italy are also rich in these objects. *Fictile Ivories* are casts in a plastic material from the original pieces.

IVORY, VEGETABLE, is the white ivory-like albumen which envelops like a thick shell the kernel of the fruit produced by the *Phytelephas macrocarpa*, a palm growing in tropical South America. It is the Corozo Nut of commerce. This substance is worked up into buttons and numerous little ornamental articles. The nuts of a palm, *Sagus amicarum*, growing at the Friendly Islands, afford a nearly similar material.

J

JAGGERY, a coarse sugar, obtained in tropical countries from the juice of several palm trees.

JOSS HOUSES. Chinese temples are so termed by European travellers, who are said to have obtained the name by corrupting the Portuguese word *Deos*, God.

JUDICATURE, HIGH COURT OF. By an Act of Parliament passed in the session of 1873 (since amended and extended by other Acts), the Courts of Queen's Bench, Exchequer, and Common Pleas, the Court of Chancery, the Probate and Divorce Court, and the Court of Admiralty were abolished as separate courts, or rather were consolidated, and made to constitute the Supreme Court of Judicature. This court was made to consist of two divisions: the High Court of Justice and the Court of Appeal. The distinction between Law and Equity is no longer observed, but both branches of law are administered in the High Court of Justice. That court now consists of five divisions—namely, the Chancery division, the Queen's Bench division, the Common Pleas division, the Exchequer division, and the Probate, Divorce, and Admiralty division.

Appeals lie from the High Court of Justice to the Court of Appeal, and the ultimate court of appeal is the House of Lords The principal object of these revolutionary Acts was to break down the technical distinction between Law and Equity, which had prevailed for centuries, and to assimilate the procedure in all the courts Suitors may now obtain a complete remedy in the court to which they first apply, instead of being compelled to seek the enforcement of their 'legal rights' in one court and that of their 'equitable rights' in another when the same subject matter and the same persons are concerned The existing judges were retained, but they were empowered to dispense both law and equity in their courts, according to the circumstances of the cases brought before them Mere technical errors in procedure have not now the same fatal effect as formerly, being in most cases easily remediable Substantial justice, not the exact compliance with precedent, ought to be the main object in view in administering the law between party and party

JUNIUS, The Letters of, a series of letters on the politics of the time, which appeared in the 'Public Advertiser,' with the signature of 'Junius,' in the years 1769 1772 They attracted much attention on account of their bold and powerful attacks on the ministers, and of the excellent language in which their bitter invectives were expressed The government of the day prosecuted the printer, the law officers of the Crown declaring one of the letters to be 'a daring, scandalous, seditious, and dangerous libel' Every effort was employed to discover the author, but the secret has never yet been revealed. The conjectures on this head have been numerous, and several volumes have been written on the subject There seem to be fewer objections to the supposition that Sir Philip Francis, who had been employed in a government office and who died in 1818, was the author than to any other

K

KAIMACAN (a deputy *Arab*), the governor of a district in Turkey

KALMUCKS an Asiatic people of Mongolian race, living a nomadic life on the steppes and mountains of Turkestan, Mongolia, and Southern Siberia They number about 600 000 souls, are in part independent, and in part under the rule of the Russians and Chinese They are chiefly Buddhists, and their wealth consists of horses and cattle

KALO (formerly Taro), is the name given by the Polynesians to the *Colocasia esculenta*, nat order *Araceæ* [See Arum] It is extensively cultivated in wet places on account of its edible roots which are baked in an oven made in the ground, and are afterwards well beaten on a board with a stone pestle. It is then placed in a calabash and made into a paste with water, which is allowed to ferment for two or three days when it is considered fit to eat This paste is the *poi* of the Sandwich Islanders. *Paiai*, or hard food, is the name given to the pounded root before water has been added. In that state it is packed in leaves for carriage It is said that a piece of ground forty feet square planted with kalo will support an Islander for a whole year, and a square mile would suffice for 15,000 people for that space of time

KALPAK (*Turkish*) a hat made of lambskin amongst the Tartars, also the high caps made of felted hair worn by the Armenians, also a part of the Hungarian national costume

KAROSS, a cloak composed of the skins of animals neatly sewn together, and worn by the Caffre chiefs in South Africa

KEUPER, in Geology the German name of the uppermost division of the Trias system It is composed of a series of saliferous and gypseous shales and sandstones which reach a thickness of 1000 feet in South Germany, in which country it rests upon the Muschelkalk, another division of the Trias, which is wanting in England In this country the Keuper is less developed, but the 'bone bed of Devonshire and Gloucestershire, which abounds in the remains of saurians and fish, belongs to it

KIMMERIDGE CLAY, in Geology, the lower division of the Upper Oolite in England which takes its name from Kimmeridge, in Dorsetshire The beds consist chiefly of a bituminous shale several hundred feet thick, and forming here and there an impure coal. The shells are marine, and as the remains of plants are scanty, it is thought that the bitumen may be of animal origin

KINEMATICS (*kinema*, movement: *Gr*), a branch of Mathematics dealing with the motions, whether simple or compound, of particles and bodies, introducing the conceptions of time and velocity, but excluding that of force.

KISTVAEN (*kist*, a chest: *Ang. Sax.*; *maen*, a stone: *Brit.*), an ancient sepulchral structure, composed of three or four upright stones, arranged so as to form a small chamber, with a large flat stone across the top. After the body had been placed therein, it was covered with a mound of loose stones and earth forming a tumulus.

KNIGHT'S PROBLEM at Chess; this consists of placing a knight upon any one of the sixty-four squares of a clear chess board, and making him leap successively into every other square without entering any one a second time.

KOLA NUTS, the seed of a tree, *Sterculia acuminata*; nat. order *Sterculiaceæ*, growing in tropical Africa. They are about the size of a pigeon's egg and of a brown colour, with a bitter taste. The natives prize them highly, and are in the habit of eating part of one before taking a meal, in order to improve the flavour of anything they eat or drink afterwards. Analysis shows that they contain theine.

KRUMEN or **KROOMEN**, the black inhabitants of a part of the west coast of Africa, south of Liberia, called the Kru Coast. They are intelligent and muscular, and are much sought after by merchant vessels and men-of-war to perform the rougher duties of the service.

L

LACQUER, JAPAN. The material for this varnish is obtained by making incisions in the bark of a tree (*Rhus vernicifera*, nat. order *Terebinthaceæ*) when the sap is rising. Lacquered articles in the form of cups, dishes, &c., are universally employed by the Japanese, instead of crockery and glass. Good old lacquer-work is very costly even in Japan; the best is usually in the form of small boxes. The tests of good lacquer are said to be its high finish, its satiny, oily feel, and its resistance to the pressure of the thumb nail.

LACTIN (*lac*, milk: *Lat.*), is the sugar of milk, and is obtained by evaporating whey to a sirupy state, and allowing the lactin to crystallise out. When purified it forms white four-sided prisms of a sweetish taste. It is composed of carbon, hydrogen, and oxygen, twenty four atoms of each.

LADY CHAPEL, a chapel in churches dedicated to the Virgin. In English cathedrals it is usually placed at the extreme east end beyond the chancel.

LANCEWOOD, employed by coachmakers on account of its toughness and flexibility, is procured from a South American tree, the *Duguetia Quitarensis* of botanists, nat. order *Anonaceæ*, to which order the CUSTARD APPLES belong.

LAPITHÆ. [See CENTAUR, p. 123.]

LASSO (*Span.*), a strip of hide many yards in length with a noose at one end, employed by the GAUCHOS of South America in capturing wild cattle, horses, and sheep. When the man is on horseback, it is skilfully thrown in such a manner that the noose catches the neck, horns, or legs of the animal.——The Bolas, used for the same purpose, are two metal balls attached to the ends of a thong, itself attached to the end of a long strip of hide. When chasing an animal, the man keeps the balls whirling wide apart over his head, until the proper moment arrives for launching them. On striking the object they twist round it and effectually secure it.

LATTICE LEAF PLANT, a water plant, the *Ouvirandra fenestralis*, nat. order *Naiadaceæ*, growing in Madagascar. The leaf is very remarkable from being pierced with holes like a coarse sieve, the cellular tissue not filling up the meshes of the vascular tissue. There are two other species of the genus in Madagascar, but only one of these has skeleton leaves. A fourth species has been lately found in Eastern Africa.

LAUGHING GAS. [See NITROUS OXIDE, p. 494.]

LECTERN, or **LETTERN** (*lectare*, to read: *Lat.*), the desk or stand on which the large books used in the services of the Roman Catholic churches are often placed. They are frequently seen as ornamental objects in modern churches.

LEONIDES, the name of the meteor showers, which occur annually from the 12th to the 14th of November. Their radiant point is the star ε, in the Leo constellation.

LETTERS OF THE ALPHABET, THE, are usually divided into vowels and consonants. The sounds of the latter are classified by phonologists, according to the organs used in pronouncing them, into (1.) Gutturals (absent in English, but heard in *ch*, of the Scotch *loch*, and the German *ach*) from *guttur*, the throat: *Lat.*, because the back of the mouth at the top of the throat is brought into play; (2.) Palatals—hard C and G, K, Q; (3.) Nasals (M, N), from *nasus*, the nose: *Lat.*; (4.) Linguals (D, L, T), from *lingua*, the tongue: *Lat.*; (5.) Labials (B, F, P, Ph, V), from *labia*, lips: *Lat.* As to the remaining letters of the English language, H is an aspirate, and S and Z are sibilants (*sibilare*, to hiss: *Lat*). R is a compound lingual and palatal, X a compound palatal and sibilant. Another division of letters according to their sounds is into—(1) Tenues—K, P, T; (2) Aspirates—H, Th, Ph, F, V, and the German Ch, (3) Half vowels—R, L; (4) Sibilants—S, Sh, Z; (5) Nasals—M, N; (6) Medials—G, D, B In English forty-two elementary sounds are represented by twenty-six letters Eighteen of the elementary sounds are vocalic. 'When we come to compare,' says Dr Angus, 'the two and forty sounds of our language, with the six and twenty letters that are employed to represent them, we see at once the deficiencies of our alphabet The theory of a perfect alphabet requires that every simple sound should have a single sign, that no sound should have more than one sign, and that similar sounds should be represented by similar signs, these last varying according to the degrees of likeness which the sounds represent. If the English alphabet be tested by these three principles, it will be found singularly unsatisfactory It is at once uncertain, inconsistent, erroneous deficient, and redundant'

LINGULA (a little tongue: *Lat*), a genus of bivalve mollusks belonging to the class of Brachiopoda, and remarkable for its immense duration in geological time, having been found in the oldest conchiferous rocks (Cambrian epoch), and being still represented by living species

LONGEVITY (*longævitas*, long life *Lat*) Flourens, the French physiologist, was of opinion that the natural duration of the life of an animal is five times the period it takes to arrive at maturity Applying this to the human race, it would appear that the natural expectation of life is at least one hundred years. Dr P Hood, in writing upon this subject, says, that 'most, if not all, of our illnesses are the result of one of two things, either of our ignorance or of our indiscretion—our ignorance in not being acquainted with the laws that govern health, or our indiscretion when we know them, in failing to yield obedience to them Nothing can be easier than to test the truthfulness of this painful aphorism, if those who hear it will apply it to the cases of the persons with whom they have been intimate, and who have died long before their time. They will usually discover that some imprudence had been committed by the individual, either for a longer or a shorter time, he may have indulged too freely in the pleasures of the table, abandoning the exercise which was formerly customary to him; he may have become a daily or nightly spirit drinker—one of the most undermining habits that can be pursued, even although it may not appear to produce any ill effects at the time. He may, in fact, have transgressed the majority of those laws which govern our health, in some instances knowingly, in others unconsciously, the result however being always the same. Excess in eating, in drinking, in fasting, in smoking, may all prove factors in the shortening of the duration of life, as well as undue exposure to cold with an insufficient amount of clothing; but, perhaps, the most fertile source of all is neglect of the signs of coming diseases with which Nature invariably furnishes us. If we allow these signs to pass by, or to escape us, without attempts at correcting what they indicate, a downward progress is suffered to continue, which might otherwise have been long retarded' How desirable is it, then, that instruction in regard to the leading rules for the preservation of health, and to the scientific truths on which they are founded, should be communicated to us in our early years along with—one might almost venture to say before—the mysteries of Latin composition and Greek verse. Since this subject has an immediate bearing upon our corporeal well being, and therefore on our happiness throughout our lives, it surely ought to stand amongst the foremost branches of our education. But what is the fact? The great majority of children are taught nothing whatever upon this head, and they grow up in lamentable ignorance of the elements of the great science of living The calamitous consequences of this neglect are only too plain. By the non-observance of a few simple rules, a vast number of persons born into the world are cut off prematurely, besides having their shortened lives afflicted with various avoidable diseases. (On this subject a series of little works entitled 'Health Primers,' published by D Bogue, or another series, 'Manuals of Health,' S P.C.K, may be profitably consulted.)

M

MÆNADS, or **MÆNADES**, the Bacchantes, or followers of Dyonysos or Bacchus, who derived their name from their frantic behaviour (*mainomai*, to rage: *Gr.*).

MAFIA, a secret society in Sicily, with the same objects as the **CAMORRA** (*St*) at Naples.

MAGYAR, one of the Ugrio-Finnic tongues, spoken by the people of Hungary.

MAHABHARATA in Sanscrit Literature one of the two great national epics, consisting of nineteen divisions with 220 000 lines The principal subject is the contest of the Bharata (Pandu and Kuru) for the throne of Hastinapura but a great number of other Indian stories are interwoven The work has been printed in four volumes, and translations have been made into French and German

MAHADEVA one of the titles of the Hindoo deity Siva

MAHRATTI the language spoken by about 15½ millions of persons living in the states into which the former Mahratta empire has been divided Gwalior Indore Baroda, &c It is derived from the Sanscrit

MAJOS (*Span*) the male inhabitants of some valleys in Andalusia noted for their gay costume and blustering behaviour The women who are worthy companions of their mates are termed *Majas*

MAJUSCULE, in Palæography a writing in which the letters are all capitals employed in ancient manuscripts

MALAGASY the language spoken in Madagascar it is a dialect of the widely spread Malayo Polynesian tongue of which it is the most westerly member Many African words are intermixed

MALAY LANGUAGES a distinct family of tongues spoken in the Philippine Islands, the islands of Formosa Borneo, Celebes, Sumatra, Java, and the Malay peninsula. When the Malays were converted to Mohammedanism they adopted the Arabic *characters*, in which all their literature is written and their correspondence has been conducted with them from that time to the present although said to be unsuited to the Malay tongue To this family belong the Malayo-Polynesian languages spoken by the Polynesian islanders. There are two branches one spoken by the dark race inhabiting Fiji and other islands north-east of Australia the other by the brown race dwelling in New Zealand the Samoan Islands, the Marquesas Tahiti and the Sandwich Islands This tongue is highly vocalic soft, and musical

MALMSEY a wine said to derive its name from Malvasia in Greece, or Crete During the Middle Ages it was highly esteemed In that old poem the 'Morte d Arthure' we read of malvesye and muskaddel those mervelyous drinkes' The most celebrated wine of this name in later times is that made from a peculiar grape in the island of Madeira, a strong luscious wine with powerful bouquet

MALPIGHIAN CORPUSCLES minute round bodies, found in the spleen and kidneys. They were named after Malpighi an Italian anatomist of the seventeenth century

MAN, RACES OF Many attempts have been made to mark out the races of man by clear, well defined lines of separation, but ethnologists are at variance as to the number of divisions and as to the characters upon which the varieties are to be limited and circumscribed There are classifications of races (says Professor Owen) varying from thirty to the three predominant ones which Blumenbach first clearly pointed out—the (black) Ethiopian the (brown) Mongolian and the (white) Caucasian or Indo European These varieties merge into one another by easy gradations The Malay and the Polynesian link the Mongolian and Indian varieties and the Indian is linked by the Esquimaux again to the Mongolian The inhabitants of the Andaman Islands New Guinea, New Caledonia and Australia in a minor degree seem to fill up the hiatus between the Malay and the Ethiopian varieties and in no case can a well marked, definite line be drawn between the physical characteristics of allied varieties these merging more or less gradationally the one into the other

The following arrangement of the principal races is perhaps as convenient as any that have been sketched —

WHITE RACES

1 *Arabian* Nose prominent lips thin, beard abundant hair straight or flowing

2 *Abyssinian* Complexion scarcely becoming florid nose prominent, hair crisped

BROWN RACES

3 *Mongolian* Beardless hair quite straight and very long (including the American Indians)

4 *Hottentot* Negro features, close woolly hair, diminutive stature

5 *Malay* —Features not prominent in the profile, complexion darker than in the two preceding races hair straight or flowing (including the Malayo Polynesians New Zealanders Australians the people of Madagascar, and the Californian Indians) See POLYNESIA

BLACKISH BROWN RACES

6 *Papuan* Features not prominent in the profile, beard abundant, skin harsh to the touch, hair crisped or frizzled

7 *Negrillo* —Beardless, stature diminutive features approaching those of the negro, and the hair woolly

8 *Indian* —Features approaching those of the Arabian, hair straight or flowing

9 *Ethiopian* —Complexion and features intermediate between those of the Indian and Negro, hair crisped

BLACK RACES

10 *Australian* —Negro features, with straight or flowing hair

11 *Negro* —Close woolly hair, nose much flattened, and lips thick

MANX, that dialect of Celtic spoken in the Isle of Man. It is rapidly becoming extinct

MAORIS, the native name of the New Zealanders, a branch of the brown Malayo Polynesian race. Their traditions say that their ancestors came from the north and north-east They are a fine race of men, physically

MARCIONITES, a religious sect which arose in the second century, so called from their founder, Marcion, who seems to have been imbued with Gnostic ideas They imagined that besides the two principles of good and evil there was a third the creator of the world and the God of the Jews who was partly good and partly evil It was the good principle that sent Jesus Christ into the world that the evil principle might be extirpated and the Jewish Deity neutralised

MARK the new silver coin of the German empire its value is about 11¾d It is divided into 100 pfennigs

MARS Professor Asaph Hall of Washington, by employing a refractor of 26 in aperture, has discovered that this planet has two small moons circling round him at the distances of about 12 400 and 3700 miles from his surface, and in periods of about 30h 17m, and 7h and 39m respectively The motion of the latter round its primary is effected in less than one third of the time of the primary's rotation, a case unique in the solar system These moons which have been named Deimos and Phobos have diameters of six or seven miles. The mass of Mars is now believed to be about the 1200th part of the earth's mass, or the 3 093 500th part of the sun's mass

MARSEILLAISE the song written by Rouget de Lisle, at Strasburg in 1792 beginning, Allons enfans de la patrie and set to a German melody It became a favourite song of the revolutionary party

MATADOR (the killer *Span*), the man whose duty it is at a bull fight to kill the bull after it has been sufficiently tormented by others

MATE, YERBA DE or Paraguay Tea, is the leaf of the *Ilex Paraguayensis* a small tree, allied to our holly growing wild in the forests of Brazil and the Argentine Republic. The leaf is prepared for use by roasting Its infusion forms a favourite beverage with the people of South America in place of ordinary tea and coffee It contains like them the principle theine The usual mode of taking it is to suck it from the cup through a tube

MATICO (*Span*), the leaves of *Piper angustifolium*, nat order *Piperaceæ*, a native of South America. An infusion is employed as a styptic in internal hemorrhages and in affections of the mucous membrane.

MAUND, a standard weight of British India, equal to 100 lbs. English Troy weight It is divided into forty seers

MAZER, a wooden cup or bowl, often carved or otherwise ornamented, and deriving its name from being usually made of mazer or maple wood (*Maderholz Germ* speckled wood *i e*, maple)

MEASURES [See WEIGHTS AND MEASURES (Sup)]

MEGALESIAN GAMES, ancient Roman games instituted in honour of Cybele the great (*megale Gr*), goddess

MEGALITHIC REMAINS (*megas*, great, *lithos* a stone *Gr*) prehistoric arrangements of large blocks of stone usually in circles or avenues Stonehenge is the finest example in Britain Their origin and purpose have been the subject of much discussion Formerly those in this country were attributed to the Druids Some have thought them to be places for religious worship others places of judicial meeting or places of sepulture for chiefs or warriors, and even an astronomical purpose has been suggested

MELANESIA (*melas* black, *nesos*, an island *Gr*) a name given to those islands in the South Pacific which lie between the meridians of the Tonga Islands and New Guinea, and which are inhabited by black races distinct from the brown Polynesians [See PAPUANS, NEGRITO (Sup)]

MELAPHYRE (*melas* black *phurein*, to mix together *Gr*) a volcanic rock having a base of black augite with disseminated crystals of felspar It is a variety of black porphyry The term has been loosely applied to a number of Palaeozoic eruptive rocks differing widely in mineralogical composition

MERCAPTAN, in Chemistry, an alcohol in which the oxygen of common (ethylic) alcohol is replaced by sulphur It is a whitish fluid lighter than water with an extremely penetrating and offensive odour so much so that until largely diluted with common alcohol it can hardly be approached

MERIDIAN CIRCLE the same as a Transit Instrument, which see

MESTIZO (*Span*), in America the child of a white person and an Indian, whilst the name Castizo is given to the child of a white person and a Mestizo.

METAMERIC, a term applied by chemists to bodies which have the same chemical composition and atomic weight, but differ in some of their properties

METAMERISM (*meta*, together *meros*, a part *Gr*), in Zoology, the property in an animal of being constructed by a repetition of like parts (*metamera*); as in worms, where ring succeeds ring

METAYER SYSTEM of land tenure. This consists of the payment of rent by the tenant, not in money, but by a share of the produce of the land, usually one half (*medietas*, a half: *Lat.*). The arrangements between landlord and tenant vary in different places as to their respective contributions to the required materials, seeds, manure, and implements.

METEOROLOGY. 'It cannot be disputed,' said Sir John Leslie many years ago, 'that all the changes which happen in the mass of our atmosphere, involved, capricious, and irregular as they may appear, are yet the necessary results of principles as fixed, and perhaps as simple, as those which direct the revolution of the solar system.' The rotation of the earth on its axis is the chief cause of changes in the weather, and the sun must be looked upon as the *primum mobile* of meteorological phenomena. The main object of meteorologists in all their investigations is the establishment of data by which the state of the weather at a future time may be foretold. Although a scientific basis for this has not yet been laid, yet through the combination of observations and the use of the electric telegraph, a beginning has been made, and in many cases prognostications for a short date have proved to be fairly accurate. The Government has established a Meteorological Office in London, which issues daily to subscribers, and for exhibition at various public offices, seaports, and fishing stations, a weather chart giving a graphic representation of (1.) the barometrical pressure, (2.) the temperature, (3.) the wind and sea disturbance, and (4.) the weather and state of the sky over the United Kingdom and some of the adjacent parts of the Continent, for 8 A.M. every morning. Besides this, the same Office regularly publishes in some of the daily newspapers little charts of the weather founded upon the same returns which afford materials for the construction of the larger chart. These smaller charts exhibit (1.) the isobars of our islands, that is, the lines of equal barometrical pressure, (2.) the direction and strength of the wind in different places, (3.) the state of the weather and sky at different localities, and (4.) the state of the sea in different parts. Moreover, whenever the Office receives telegraphic reports indicating that a considerable disturbance of the atmosphere has reached or is near our shores, warnings are sent by telegram to those parts of the coast which are apparently threatened. Telegrams are now regularly sent from America to our Meteorological Office when a storm threatens to cross the Atlantic, and the information is at once forwarded to the principal ports. Such warnings are valuable; at the same time experience shows that whilst some storms are turned aside on crossing the ocean and never reach us, others arrive unannounced.

Some meteorologists are of opinion that the seasons run in cycles of about eleven years, and that a period of heat and drought, usually of three years' duration, is experienced as part of a cycle. The cycle, however, appears to be somewhat irregular, being sometimes advanced and sometimes postponed for a year. Again, it has been thought that there is a correspondence between the dry seasons and the minima of sun spots and between the wet seasons and the maxima of sun spots, but this hypothesis does not seem to have been satisfactorily made out at present.

Rain.—The greatest known deposit of rain on the globe takes place at Cherra Ponjee, in the Khasyah Mountains, 300 miles north-east of Calcutta, at which spot there is an annual fall of 610 inches, and nearly as much falls at Dhurmsala, in Western India. In Britain, the heaviest deposit is at Seathwaite, amongst the Borrowdale hills in Cumberland, where there is an annual fall of 165 inches.

The experiments of Dr. Tyndall have shown that the minute quantity of water which is suspended as invisible vapour in the atmosphere acts to an astonishing degree as a warm clothing to the earth. Although the atmosphere usually contains only one particle of aqueous vapour to 200 of air, yet that single particle absorbs 80 times as much heat as the 200 particles of air. If the aqueous vapour were removed from the air overspreading this country for a single summer night, every plant not capable of bearing extreme cold would be destroyed. The radiation of heat from the ground would be so great that intense frost would prevail long before morning.

Water being heavier than air, the suspension in the atmosphere of clouds and visible vapours is an unexplained fact. The vesicular condition of the particles has never been proved, and if it had been, would not throw light upon the matter.

Wind.—When the air has a motion of from 30 to 35 miles per hour, the wind is considered high, and if the rate of motion were 50 miles per hour, there would be a storm, and the pressure exerted by the wind would be about 12 lbs. on the square foot. But on the 27th of December 1868, the anemometer at the Bidston Observatory, Birkenhead, registered a velocity for a single hour of 92 miles, and the pressure instrument registered pressures exceeding 70 lbs. on the square foot.

Observatories at Elevated Stations.—As it is manifestly desirable to ascertain whether observations taken in elevated positions may not throw light upon the constitution of the atmosphere and the laws determining its changes, many observatories have been lately established at points raised a considerable height above the sea. In France there is a meteorological station on the Puy du Dome (Auvergne) at the height of 4809 feet, and another has been placed on the Pic du Midi (Pyrenees) at 9439 feet above the sea. A third is about to be built, at the height of 6200 feet, on Mont Ventoux, an isolated peak near Avignon. In Upper Austria there is a station on the Schafberg, nearly 6000 feet above the sea. Three stations in Italy have been formed at the heights of 8360, 8343, and 7087 feet above the sea. In Sicily, upon Mount Etna, a station is to be formed at the height of 9652 feet. At the hospice of St Bernard there is a station 8130 feet above the sea. There are stations in the United States on Mount Washington, Mount Mitchell, and Pike's Peak, Colorado, which have the heights of 6600 feet, 6691 feet, and 14,216 feet. The only station in Great Britain above 3000 feet is that about to be built on Ben Nevis.

MICRONESIA (*micros*, small; *nesos*, an island: *Gr.*), the name given to the small chains, or clusters of islands scattered over that part of the Pacific, lying to the W. and S.W. of the Sandwich Islands, and to the N. of the equator. The Caroline Islands, Marshall Islands, and the Ladrone Islands form part of Micronesia. They are inhabited by Malayan races.

MIKADO, the title of the Emperor of Japan. Formerly the Mikado was only the spiritual head of the State. The temporal sovereignty was exercised by the Tycoon (Shogun or Siogun), who commanded the army, received the revenues, and governed the country; whilst the Mikado, remaining secluded within his palace, was honoured as a deity. In 1867, however, it was discovered that he was man the Tycoonate was abolished, and the Mikado alone now governs Japan with the assistance of a body of ministers. [See DAIMIOS (*St.*).]

MILDEW, the name of various minute fungi, which in the form of a fine powder attack growing plants, especially in damp seasons. They appropriate the juices of the plants upon which they settle, and produce disease. Mycologists assign them to several genera. The vine mildew, *Erysiphe* or *Oidium Tuckeri*, has done immense damage of late years in the vineyards of Europe. Its ravages, however, can be kept in check by the application of sulphur. The black or sooty mildew has attacked the orange and coffee plantations of various parts of the world, and it frequently appears in our conservatories. The only remedy for this plague seems to be careful washing and syringing; but these operations cannot be carried out where plantations are concerned. The wheat mildew, *Puccinea graminis*, is also a plague for which no remedy has been discovered. One form of rust is an early state of this mildew.

MINEVERE, a fur mentioned in old English writers, and by the heralds. It is said to have been taken from the white belly of the grey squirrel; but some contend that it was the fur of the ermine spotted with the fur of the weasel.

MINK, the *Putorius Lutreola* of naturalists, an animal of the Weasel tribe which affords a valuable fur, and is a native of Canada and the Columbia district of North America.

MINORITES (*fratres minores*: *Lat.*), one of the names given to the FRANCISCAN Friars, who were also called Barefooted and Grey Friars.

MINORITIES, REPRESENTATION OF. This does not mean that all minorities of voters ought to be represented; but only such minorities as are large. Mr. J. S. Mill contended that 'a mode of voting which does not keep this object in view is contrary to popular government; it does not sum up the opinion of the community correctly. There is no true popular representation if three-fifths of the people return the whole House of Commons, and the remaining two-fifths have no representatives. Not only is this not government by the people, it is not even government by a majority of the people, since the government will be practically in the hands of a majority of the majority. If numbers are to be the rule, a third of the people ought not indeed to have two-thirds of the representation, but every third of the people is entitled to a third of the representation.' To carry the representation of minorities into effect, it has been proposed that every constituency should have three members, whilst each elector should only be allowed two votes; or else that having as many votes as there are members to be elected, he should be allowed to accumulate his votes on one candidate. By either of these plans a minority amounting to a third of the constituency, may by acting in concert, and determining to aim at no more, return one of the members.

MINUSCULE (*minusculus*, rather small: *Lat.*), the style of writing in old manuscripts where small (not capital) letters were employed; used in opposition to MAJUSCULE (*St.*).

MISERERE (have mercy: *Lat.*), a name given to a bracket on the underside of the seat of a canon's stall in an old church. Such seats were made to turn up on a hinge, and the underside was frequently richly carved.

MITRAILLEUSE (*mitraille*, grape shot: *Fr.*), a gun with a number of barrels firmly united together, which can be rapidly loaded and discharged. The French mitrailleuse has twenty-five barrels, the Austrian thirty-seven. The GATLING GUN (*St.*) is a species of mitrailleuse. These guns are mounted on carriages like cannons.

MOCASSIN (*Indian*) a shoe made of skin worn by the Indians of North America

MODIUS (a corn measure: *Lat*), an object shaped something like a gardener's flower-pot, often seen on the head of Jupiter Serapis in Roman sculpture.

MŒSO-GOTHIC an ancient Low-German dialect allied to modern English through the Anglo Saxon. The only remains of it consist of portions of the Scriptures translated by Bishop Ulphilus, about the year 360 for the use of the Visigoths, who had a settlement in Mœsia near Mount Hæmus

MONERA (*moneres*, single: *Gr*), the name given by Professor Haeckel to a group of animal forms, the most rudimentary known, including AMŒBA (*St*) and others

MONGOLS, a people forming the principal part of the inhabitants of Mongolia, one of the great provinces of the Chinese Empire. They profess Buddhism, and their tongue is one of the ALTAIC (*St*) languages. They were formerly predatory marauders, but now support themselves by rearing camels horses, and cattle, and by the chase. They are divisible into three main branches the East Mongols living east and west of the Gobi Desert, the West Mongols or KALMUCKS (*St*), and the Burats who live in the Siberian government of Irkutsk

MONISM (*monos*, single: *Gr*), the doctrine of unity, or that of a single principle of being in opposition to Dualism The monistic philosopher holds that there is no force without matter and no matter without force

MONOCHLAMYDEOUS (*monos*, single, *chlamys*, a garment: *Gr*), in Botany, a term applied to flowers which have only one floral envelope, whilst the Dichlamydeous flowers have both calyx and corolla.

MONSTRANCE (*monstrare*, to show: *Lat*), the vessel in which the consecrated wafer is placed when it is held up before the congregation in the Mass

MOON. [See p 470] During its year of 345¾ of our days there are only 11¾ lunar days, each lasting 29½ of ours. The range of temperature on the surface of the moon between the lunar midday and midnight is very great, perhaps as much as 500° F The area of the moon is about 14,600,000 square miles. Her surface has been very carefully examined, mapped, and photographed. Besides the mountain ranges and cones, with deep craters, that diversify her face, there are bright radiating lines of immense extent, the meaning of which is not comprehended. One of these lines can be traced nearly from one side to the other of the hemisphere exposed to our view. Some of the numerous craters are much larger than the largest craters on the earth, being more than 100 miles in diameter, with walls upwards of 10 000 feet high, but there are also many very small craters

MULCHING, a gardener's term for the operation of spreading some material like spent manure, leaf mould, or short grass mown from a lawn, upon the ground around plants, with the object of preventing too rapid evaporation from the soil during dry weather.

MURÆNA (an eel: *Lat*), in Ichthyology, a genus of marine eels, to which belongs the *M. Helena*, a Mediterranean fish prettily marbled with brown and yellow, much esteemed by the ancient Romans, who kept it in tanks in readiness for their banquets, and produced it alive in water on the table that the guests might admire its motions and colours before it was cooked One wealthy tyrant was in the habit of flinging slaves who had offended him alive into his fish ponds as food for his murænæ

MUREXIDE (*murex*, a purple dye: *Lat*), a body prepared from uric acid, which crystallises in small square prisms, having the property of exhibiting by reflected light a beautiful green metallic lustre, whilst by transmitted light they are deep purple red. They form pretty objects under the microscope. They are a compound of carbon, hydrogen, nitrogen and oxygen

MUSCOLOGY (*muscus*, moss: *Lat*), that division of cryptogamic botany which relates to the MOSSES and HEPATICÆ (*St*)

MYCELIUM (*mukes*, fungus: *Gr*), in Botany, the spawn or first product of the spores of fungi It is usually composed of minute threads, but it may have a membranous, a tubercular, or a pulpy structure. From it springs those varied forms which are known as mushrooms, moulds, &c, the subject of the study of mycologists

MYCOLOGY (*mukes*, a mushroom: *Gr*), the division of cryptogamic botany, embracing the fungi, under which are classed mushrooms, toadstools, green moulds, blights like the destructive oidium, and similar growths.

N

NARTHEX, a division in early Christian churches to which penitents and catechumens were limited, where night watches were held, and where corpses were placed during the funeral service. The narthex is still to be distinguished in a few old churches in Italy.

NATURAL SELECTION, Mr Darwin's expression for the process by which he believes that the various existing species of animals and vegetables have been evolved, viz., in consequence of certain forms or varieties possessing advantages over others in the struggle for existence. They may be considered as selected by nature to survive and perpetuate their kind, whilst the forms less advantageously endowed perish.

NATURE, LAWS OF, all the uniformities which man has discovered to exist among natural phenomena when reduced to their simplest expression. They are our statements as to the orderly sequence which we discern in the phenomena of the universe. It has been pointed out that these so-called 'laws' are of two kinds; one set being mere generalisations of phenomena such as the laws of planetary motion and the laws of chemical combination. These laws do not explain or account for everything. The other set of laws express the conditions of action of a force, the existence of which is made known to us by the direct evidence of our own consciousness. Laws of this kind are based on the fundamental conception of a force or power. If the existence of a force such, for example, as that of gravity is admitted, and the conditions of its action can be accurately stated, then the 'law' that expresses them may be said to govern the phenomenon, and any phenomenon which can be brought under that law is said to be explained. When any new phenomenon is explained it must be shown to be like something previously known, and thereby brought into conformity with some law.

NEBULÆ. [See p. 488.] It would appear from observations made at the Melbourne Observatory, Australia, that some of the nebulæ figured by Sir John Herschel at the Cape of Good Hope, have considerably changed their appearance, whilst others are so greatly altered as to be only recognised by their position. Two nebulæ have entirely disappeared. A few years ago all nebulæ which were irresolvable by the most powerful telescopes were deemed to be composed of matter in a state of vapour, but recent spectroscopic researches appear to show that only about one out of four of the irresolvable nebulæ is truly gaseous, as the rest give a faint continuous spectrum, thus proving that they are clusters of closely approximated stars which could be seen as distinct bodies if a sufficiently powerful telescope could be brought to bear on them. The true gaseous nebulæ do not afford a continuous spectrum, but one of three lines, two of which pertain to hydrogen and nitrogen, whilst the third has not yet been recognised.

NEGRILLO or **NEGRITO** (*Span.*), a blackish-brown race of men, inhabiting the New Hebrides, and some other islands of the South Pacific. They are small in stature, have the lower part of the face projecting, with the features and complexion of the Negro, and rarely a beard. The hair is more woolly than the Papuan's, but not so matted as the Negro's.

NEITH, a female deity in Egyptian Mythology, who was said to claim self-generation, 'I came from myself.' She was especially worshipped at Sais in the Delta, and was represented as a woman bearing a shuttle on her head; and sometimes by a vulture bearing on its head the Pharaonic crown.

NEOLITHIC. [See STONE AGE (*St.*).]

NITRO-GLYCERINE, a light-coloured oily liquid about 50 per cent heavier than water, prepared by causing a mixture of nitric and sulphuric acids to act upon glycerine. When pure it freezes at about 40° F., and in this state it is much safer to carry than when liquid. Its explosive power is estimated at from nine to ten times that of gunpowder. It is the basis of various explosive powders. [See DYNAMITE (*St.*).]

NORNS, the three sister fates of Scandinavia, who spin and weave the thread of human destiny, Urdhr, Verdhandi, and Skuld.

NORTH-EAST PASSAGE, the passage by sea from the North Atlantic Ocean, along the coast of Siberia, to Behring's Straits at the northern extremity of the Pacific Ocean. The North-East Passage has been recently made for the first time by a Swedish expedition, under Professor Nordenskjold.

NORWEGIUM (*Norvegia*, Norway), a metal detected in 1879, by Dr. T. Dahll, in a metallic compound of arsenic and nickel, from a mine in Norway. It is white with a faint shade of brown, is slightly malleable and fusible at a dull red heat. Its hardness is about that of copper. Density, 9·44; chemical equivalent, 145.

NOTOCHORD (*notos*, birth; *chorde*, a string: *Gr.*), or *Chorda dorsalis* (*Lat.*), a thread of cellular structure covered by a sheath running through nearly the entire length of the embryo of all vertebrate animals. It has been found also in the larvæ of some invertebrate Ascidiæ. Except amongst the lower vertebrates where no vertebral bodies are developed, the vertebræ, as the embryo grows, are deposited round the notochord, which thus forms the middle of the vertebral column.

NOUMENON, *pl.* NOUMENA (*Gr.*), in Transcendental Metaphysics, things *per se*, as distinct from their phenomena or appearances with which alone we are acquainted. It is admitted that noumena cannot be known by man, but it is asserted that it is necessary to postulate their existence.

NUDIBRANCHIATA (*nudus*, naked; *branchiæ*, gills: *Lat.*), an order of marine mollusks, usually of a snail-like form. Their branchiæ are exposed on the back or at the sides of the body, without the protection of a shell. There are numerous genera (Doris, Eolis, &c.) and species, many of which are very prettily coloured. They are found on all coasts, some being animal, others vegetable feeders.

NURAGHI, ancient round towers of stone, with internal chambers, found in Sardinia, and similar to the Irish round towers. They are of unknown date.

O

OBELISK. [See p. 503.] Pliny says that they were considered by the Egyptians to be symbolic of the solar rays. They were erected in pairs before the entrances to the temples. It is singular that they have only been found on the east bank of the Nile. Forty-two ancient obelisks are known, of which six are still erect in Egypt, and eleven are prostrate there, twelve are at Rome (but two of these are thought to be Roman work), two at Florence, one at Paris, and three at London (there being two small ones in the British Museum, besides the one brought from Alexandria in 1878, and erected on the Thames Embankment, which last bears the name of Thothmes III., by whom it was erected at Heliopolis, about 1500 B.C.). Finally, one was removed to the United States of America in 1879.

OBVERSE (*obversus*, turned towards: *Lat.*), in Numismatics, that side of a coin upon which the principal figure is stamped, the other side being the reverse.

OCEAN. [See p. 505.] The numerous elaborate investigations which have been made of late years by various special expeditions fitted out at the expense of different governments, especially the British, have thrown much light upon the secrets of the ocean depths, and many facts have been established which were not only new but quite opposed to previous beliefs. It was imagined, for instance, that animal life would entirely cease at a depth of 300 fathoms, but zoophytes, echinoderms, mollusks, annelids, and crustaceans of perfect organisation, as well as sponges and foraminifera, have been brought up from enormous depths. Indeed, animal life has been found at all depths to which the sounding line has reached. Again, it was previously thought that the temperature of the deep sea was everywhere 39° F.; but the temperature of the bottom of the ocean has been found to vary from 32° F. to 47° F., and that at points only eight or ten miles distant. The usual arrangement of the zones of temperature is that at the depth of about 500 fathoms there is a band with a temperature of 40° F. Above this, the temperature varies over different areas; that is to say, within the tropics the temperature of the upper water rises to the surface, whilst within the Arctic and Antarctic circles it falls. Beneath the neutral band, the temperature almost invariably sinks with increasing slowness until the minimum is reached at the bottom. This minimum varies in different localities; thus in the North Pacific the bottom temperature was always about 35° F., but near Tongataboo, within the tropics, in the South Pacific, the bottom temperature was 32° 9′ F. Over three-fourths of the Atlantic there is a nearly uniform bottom temperature of 35° 3′, but in the remaining fourth—namely, from the coast of South America to a line drawn from Tristan d'Acunha to Ascension and from the equator southward—the bottom temperature varies from 31° to 33° 5′. Thus the coldest water is spread over the bottom of the western portion of the South Atlantic. Whenever deep basins are shut in by submarine ridges which cut off the access of cold water from the open ocean, it is found that they are filled with comparatively warm water. This is the case in the Gulf of Mexico, and in the basins of the Banda, Celebes, and Sulu Seas. The evidence now obtained seems to show that the great ocean basins now existing have always existed, and that the present areas of land occupy the regions in or near which land has always been. The former were areas of subsidence from very early times, whilst the latter have been regions which were elevated under the strain of terrestrial contraction. The configuration of the bed of the ocean has been hitherto unknown, but its general features are now mapped. It appears that an elevated sinuous ridge starting from Greenland runs through the Atlantic from north to south at a mean depth below the surface of 1904 fathoms. Upon this ridge in the North Atlantic are the submarine 'Dolphin Rise' and the Azores. In the trough between this ridge and the west coast of North Africa rise as separate groups the Madeiras, Canaries, and Cape Verde Islands. To the west of the great dividing ridge there are two basins. The northern extends from lat. 60° N. to 10° N., widening considerably within the tropics and occupying the great bight between North and South America. In this basin the island of Bermuda rises abruptly from a base only 120 miles in diameter. The southern begins a few degrees to the south-eastward of the last, and extends far into the Antarctic basin. The mean depth of the Atlantic is estimated at 2000 fathoms, and the deepest sounding yet obtained was a little north of the Virgin Islands in 3875 fathoms. The mean depth of the Pacific Ocean is thought to be 3880 fathoms. The greatest depth sounded by the 'Challenger' was 4575 (27,450 feet) at a spot about 1400 miles south-east of Japan, near the Ladrone group. The United States' ship 'Tuscarora' obtained a sounding off the east coast of Japan deeper than this, namely, 4655 fathoms; but there may be a little uncertainty as to this, no bottom specimen having been brought up. The bed of the Pacific slopes to its greatest depths very gradually, being but little broken by submarine ridges, except in the neighbourhood of volcanic islands. Off the Hawaiian Islands, there are submerged mountains as high as 12,000 feet. It is inferred that the bed of the North Pacific sank rather rapidly, as dead coral has been found on some of the submerged peaks, showing that they went down more rapidly than the coral could grow upwards. From recent calculations it would appear that the total area of the ocean is 143,703,000 square miles, and its mean depth about 1877 fathoms, or 0·4624 of a geographical mile. The mean height of Europe above the sea's level is estimated at 300 metres, of Asia and Africa 500 metres, of America 330 metres, and of Australia 250 metres: the mean being 420 metres. The surface ratio of land to water is considered to be 1 : 2·75. The entire bed of the ocean between the depths of 500 and 2250 fathoms is covered with a grey calcareous paste, soft above, stiffer below, and chiefly composed of the minute shells, both entire and in a state of decay, of Foraminifera belonging to the genera Globigerina, Orbulina, and Pulvulina. This is the Globigerina ooze, which has been styled modern chalk, since, if solidified, it would assume very much the appearance of our chalk deposits. Below the depth of 2250 fathoms, this ooze gradually passes into a pure red clay, consisting of silicate of alumina and red sesquioxide of iron in a state of extreme tenuity. This clay is found at the greatest depths yet sounded, and it is supposed to consist chiefly of the insoluble residuum of the foraminiferous shells after all the calcareous portion has been dissolved by the carbonic acid in the sea-water. At depths below 4000 fathoms the red clay is largely composed of the silicious tests of Radiolaria (*St*). Great quantities of pumice are found to be scattered over the bottom of the sea, not only in the neighbourhood of volcanic vents, but also on the bottom of the open ocean. Its disintegration is thought to contribute a constituent to the red clay. Nodules of manganese and iron are likewise brought up by the dredge, the metals being perhaps derived from submarine sources. To account for the vast mass of cold water, often upwards of 2000 fathoms in thickness, at the bottom of the Atlantic, Pacific, and Indian Oceans, two hypotheses have been put forward, both involving a general movement in the mass of the water. The first is, that of Sir Wyville Thomson, who says that the bottom water of the great oceans is an extremely slow indraught from the southern icy sea; and this indraught he attributes to an excess of evaporation over precipitation above the northern portion of the land hemisphere, whilst over the water hemisphere, particularly its southern portion, the reverse is the case. Thus, one part of the general circulation of the ocean is carried on through the atmosphere; the water, being raised in vapour in the northern hemisphere, is hurried by upper wind-currents to the zone of low barometric pressure in the south, where it is precipitated in the form of rain or snow. According to Dr. W. B. Carpenter, however, the *primum mobile* of oceanic circulation is the excess in the specific gravity of polar water which causes its continual descent, whilst there is a complemental ascent of the water in the equatorial zone. In other words, the disturbance of hydrostatic equilibrium is produced by an increase of density occasioned by polar cold and a reduction of density occasioned by equatorial heat. In this way there is an underflow from the poles to the equator, and an overflow from the equator towards the poles. Thus, every drop of water will be brought up from the greatest depths to the surface, except in confined seas. The greater part of the supply of cold water comes from the south polar regions in which direction the oceans are open, whereas the north polar ocean is much enclosed by land, and its water can only make its escape southward by a few comparatively narrow channels. This latter hypothesis seems to satisfy those physicists whose opinion is entitled to most weight. This general circulation of the water in the great oceans is complicated by surface currents caused by winds and the shape of the great continents In the Mediterranean there is a surface inflow through the Straits of Gibraltar, owing to the excess of evaporation over the supplies afforded by rain and rivers, and at the same time an under outflow through the same strait, owing to the greater salinity and therefore greater specific gravity of the lower water of the Mediterranean over that of the Atlantic. The *brine* of the ocean contains besides common salt (chloride of sodium), magnesia, soda, lime, sulphuric acid, and other substances. It forms on the average about 3½ per cent. of sea-water. And it has been calculated that if all the water was evaporated there would remain a deposit of solid matter to the thickness of 350 feet all over the bed of the ocean; and this would correspond to a deposit of 200 feet thick over the entire surface of the globe. With regard to carbonate of lime the analysis of numerous samples of sea-water from different regions and different depths gives a mean result of 0 269 parts of the carbonate in 10,000 parts of water (that is, about 27 parts in a million). Besides these solid matters, carbonic acid, oxygen, and nitrogen are diffused through the ocean It was ascertained that with regard to oxygen, the amount continuously decreases from the surface down to 300 fathoms, whilst from that depth to the lowest yet sounded the amount increases. This curious fact is thought to be due to the great abundance of animal life at the depth of 300 fathoms, and to the comparative scarcity of animals at greater depths, the oxygen therefore remaining unconsumed. It has been found that *light* produces no effect on sensitised paper at the depth of 60 fathoms. Now, although some animals have been discovered without eyes dwelling at various depths, other animals with enormously large eyes have been brought up from very deep water, and it has been suggested that the phosphorescence of zoophytes may afford some light at those depths. The green *colour* of shallow sea-water is believed to be caused by the suspension in it of minute particles of solid matter, whilst the dark blue colour of deep water arises from the comparative absence of such matter, and if it were entirely absent the water would probably be as black as ink.

OCCLUSION (*occlusus*, shut in: *Lat.*). When a gas is absorbed by a metal without combining chemically therewith, it is said to be occluded. For example, if a mass of hot platinum be immersed in hydrogen, a large volume of the gas will be occluded.

ODIN, or WODEN, the chief deity of the Scandinavians. He, his wife Frigga, and son Thor, have given names to three days of our week, the names for Tuesday and Saturday being supplied by the gods Tyr or Tiro, and Sætere.

ODONTOGRAPH (*odons*, *odontos*, a tooth; *graphe*, writing: *Gr.*), in Mechanics, an instrument for designing the teeth of wheelwork.

OHM, a term employed by electricians in calculating the resistance encountered by an electrical current in its passage through a wire. One ohm is the unit of resistance, and is equivalent to the resistance of 250 feet of copper wire one-twentieth of an inch in diameter. Ohm was a celebrated German electrician.

OIDIUM. [See MILDEW (*St.*).]

OLD MAN'S BEARD, the *Tillandsia usneoides* of botanists, nat. order *Bromeliaceæ*. It grows upon the branches of trees in tropical America, and hangs down in long white threads so as to resemble a lichen rather than a flowering plant. It is only used as a packing material, but its singular appearance attracts the attention of travellers.

OLEOMARGARINE [see FAT and MARGARIC ACID], a substance manufactured in North America from the fat of cattle, and largely imported into this country under the name of butterine for the adulteration of butter.

ONOMASTICAL ORDER (*onomastikos*: *Gr.*), an arrangement of words, &c., according to the meanings or matter, not in alphabetical order.

ONTOGENESIS (*on*, *ontos*, a being; *genesis*, generation: *Gr.*), the mode of development of the individual. [See PHYLOGENESIS (*St.*).]

ORES OF METALS. The following is a summary of the various ores of the principal useful metals, and of the modes of extracting the metals from them.

Gold is always found in a metallic state, and is extracted from the extraneous matter, sand, mud, &c., with which it is mixed, by washing with water, or by amalgamation with quicksilver, or with melted lead, which dissolves gold like mercury. To get rid of the lead, the process of cupellation is employed, by which oxide of lead is formed, and this is removed in a liquid state, or it falls into the porous bed on which the alloy is treated. Alloys of gold and silver are treated with sulphuric or nitric acid, of which the silver is converted into a sulphate or nitrate. Gold may be refined by forcing into the melted metal a current of chlorine, which converts the silver, antimony, &c., into chlorides.

Silver is usually found in the state of a sulphuret, and frequently along with galena, a sulphuret of lead. Chloride of silver is abundant in Chili and Peru. Much argentiferous galena is treated first by Pattinson's process, by which the lead crystallises out, and the remainder of the alloy, holding a largely increased percentage of silver, is cupelled. In Mexico the ore is converted into a chloride, and then treated with mercury to form an amalgam. For amalgamation, however, are sometimes substituted other processes, such as (1.) roasting with common salt, to form a chloride, from which the silver is obtained, causing metallic copper to combine with the chlorine. (2.) Roasting the sulphuret, mixed with the sulphurets of copper or iron, so as to form a sulphate of silver, which may be dissolved out with water, and the metal is then precipitated by means of metallic copper.

Copper is found native, in the state of oxides (red copper ore and black oxide), in the state of sulphurets (copper glance, copper pyrites, indigo and peacock copper), also as a sulphuret combined with the sulphuret of antimony and arsenic (grey copper ore), and as a carbonate in the form of malachite. The ores are roasted to expel the arsenic and sulphur, and to convert the iron into an oxide. It is then melted to remove the oxide of iron, and to obtain a sulphide of copper. Lastly, it is roasted and melted to obtain metallic copper.

Iron has numerous ores: magnetic iron ore, red hæmatite, and micaceous hæmatite or specular ore, all of which are oxides; brown hæmatite, an hydrated oxide; spathic iron ore, clay ironstone, both of which are carbonates; blackband ore, a carbonate with clay and bituminous matter; iron pyrites, a sulphuret.

Lead is found as galena, a sulphuret, and as white lead ore, a carbonate. The sulphuret is first roasted in a reverberatory furnace, to convert a part of it into an oxide and part into a sulphate. These being melted, the gas and acid are driven off, and the lead is left in a metallic state.

Mercury is largely found in the metallic state. Cinnabar is a sulphuret, from which the metal is obtained by distillation.

Tin is found as an oxide called tinstone. After calcining to expel arsenic and sulphur, the metal is obtained by smelting.

Zinc; its ores are blende, a sulphuret; red zinc ore, an oxide; and calamine, a carbonate. After calcination, so as to obtain an oxide, the metal is obtained by distillation.

ORMUZD, the good deity who was opposed by the evil deity Ahrimanes, in the dualistic faith of the followers of Zoroaster. A strife is continually going on between these two deities, and hence the mingling of good and evil in the lot of man, but in the end Ormuzd will triumph. This form of the name is Sanscrit; it also appears under the forms of Ormazes, Ahuramasda, &c.

ORTHOGONAL (*orthos*, right; *gonia*, an angle: *Gr.*), a term applied to rectangular or right-angled figures.

OSAGE ORANGE, the fruit of a tree, *Maclura aurantiaca*, nat. order *Urticaceæ*, growing in North America. It is of the size of a large orange, has a yellow exterior, and is filled with a fœtid yellow juice. It is not used as an article of food. The yellow wood is useful, being fine grained and elastic. The dyewood called fustic is obtained from another species of Maclura (*M. tinctoria*), a native of America and the West Indies.

OTHEOMETER. [See RADIOMETER (*St.*).]

OTOLITES (*ous*, *otos*, an ear; *lithos*, a stone: *Gr.*), calcareous accretions of various shapes which are formed in the ears of fishes, and assist in transmitting sonorous vibrations to the auditory nerve. They are often brought up in the dredge with other things

OTTO OF ROSES. In European Turkey the mode of manufacture is this:—Fresh-blown roses are gathered in the rose plantations before sunrise, and immediately placed in a still with water. The liquid that comes over is rose-water, and this is again subjected to distillation, when the otto is obtained. It takes about 28 cwt. of roses to obtain 1 lb. of otto.

OXGANG, in old English, signified as much land as an ox could go over with a plough during the season, estimated at from 15 to 20 acres

OXYHYDROGEN BLOW-PIPE. The light emitted by the flame of hydrogen is very feeble, but the temperature of the flame is very high. A mixture of oxygen and hydrogen affords a solid flame of great heat and peculiar appearance, which, by taking due precaution, may be employed with a blow-pipe to melt refractory substances. A thick piece of platinum, for instance, will readily melt, and a piece of hard steel will burn away in a shower of sparks. Lime, magnesia, and other incombustible bodies glow with an intense light, and can be employed when brilliant illumination is needed, as in the solar microscope instead of the sun's rays.

OZOKERITE, the name of a mineral hydro-carbon, from which paraffin can be obtained by distillation.

P

PADDY, the commercial name of unshelled rice.

PÆDAGOGY (*paidagogia*, instruction of youth: *Gr.*), the art and science of teaching young persons. In Germany they have discovered a theory of education constructed out of the pure Reason.

PALÆOCRYSTIC SEA (*palaios*, ancient; *krustallos*, frozen: *Gr.*), the North Circumpolar Ocean.

PALÆOLITHIC. [See STONE AGE (*St.*).]

PALI (*pali*, a line or row: *Sanscrit*), a language in which the sacred literature of the Buddhists of Ceylon is written. It was derived from the Sanscrit, and was a spoken tongue in India 600 years B.C. The Singhalese, or modern dialect of Ceylon, is a modification or corruption of it

PALMS. [See p. 528.] Besides the palms previously mentioned, there are many others of this noble tribe which are of great utility to man. From the juice of several species a coarse sugar called jaggery is obtained in the Indian Archipelago, Ceylon, and India. Several other species are called Cabbage Palms, from the terminal bud or cabbage being cooked for food. By cutting off the central mass of unopened leaves, the tree is unfortunately killed. The best known of these palms is the *Areca oleracea*, a handsome tree that sometimes becomes 200 feet high, and has leaves 20 feet long. Other palms yield the article known in commerce as DRAGON'S BLOOD. Fatty matters are obtained from the fruit of several species, such as the Oil Palm, an *Attalea* growing in Honduras; the Great Macaw Tree (*Acrocomia sclerocarpa*) of the West Indies and Brazil; and the still better known PALM OIL TREE of the West Coast of Africa. It is the pulpy matter surrounding the nuts which yields the palm oil of commerce. The fruit is first bruised into a paste, and then boiled in water, when the oil rises to the surface. It remains liquid within the tropics, but solidifies to the consistence of butter when taken to a cool climate. Another oil is obtained from the kernels of the nuts, but it is only used by the natives. From some palms wax is obtained. Others yield useful fibres called COIR, PIASSAVA, and *Crin Végétale*, or Vegetable Hair, the last being obtained from the Dwarf Palm (*Chamærops humilis*) of Algeria. Under IVORY, VEGETABLE, it will be seen that an ivory-like substance is obtained from a palm. One of the most important of the family is the Palmyra Palm (*Borassus flabelliformis*) of India and Ceylon. The fan-shaped leaves are used for a hundred different purposes, the wood takes a high polish and is durable, from its juice wine and sugar are made, and the young plants are used as pot vegetables. The Nipa Palm is another very useful tree growing in brackish swamps in Borneo and the Moluccas. Its nuts are like large rough cannon balls; abundance of closely allied nuts are found fossilised in the London Clay.

PANAMA HATS are made of the leaves of a tree (*Carludovica palmata*, nat. order *Pandanaceæ*) which grows in Ecuador, where the hats are principally manufactured. The leaf is cut before it begins to open, and the base forms the middle of the crown of the hat. The mid-rib is rejected, and the rest is divided into narrow strips, which are plaited together. Each hat is made of a single leaf. One of the finest quality occupies the maker for some months, and commands a very high price, but it is very durable

PANGENESIS (*pan*, all; *genesis*, generation: *Gr.*), the doctrine that the formative property by virtue of which organic beings are generated, resides in the living substance of every organised cell and in each of its component molecules, and is a necessary part of the physical and chemical constitution of the organising elements in the conditions of life.

PAPIN'S DIGESTER. [See DIGESTER.]

PAPUAN, a blackish race of men inhabiting the Fiji Islands, the Gulf of Papua in New Guinea, and some intermediate islands in the South Pacific. They are physically well developed, have skin of peculiar hardness or harshness, abundant beard and wiry hair, much frizzled. Each hair, if examined with a lens, is seen to be flattened. Their features are not prominent. They are quite distinct, both from Negroes and the Malayan islanders. The black natives of Tasmania (of whom the last, a woman, died in 1876) were allied to the Papuan races, and were distinct from the chocolate-brown Australians.

PARTICULARISM (*particula*, a small part: *Lat.*), the doctrine of those who maintain that separate interests ought to be supported; a word employed in Germany with reference to the opinion that the separate States of the Empire ought to enjoy as much independence as possible, that is, that their several governments should be carried on with the least possible control of the Imperial Government.

PASHT or **BUBASTIS**, an Egyptian goddess, one of the children of PHTAH (*St.*). She is represented as having a cat's head surmounted by a disc encircled by the viper or [illegible]eus.

PAX (peace: *Lat.*), a small tablet with a crucifix in front and a handle at the back, offered to the lips of communicants at the celebration of the Mass. It is sometimes of precious metal, set with precious stones, enamelled or otherwise ornamented.

PEHLEVI or PUHLAVI. [See PERSIAN LANGUAGE (*St.*).]

PELASGIANS. 'Greek writers from Homer and Hesiod downwards mention Pelasgians, but if we examine their statements we find that the term is used in two senses: firstly, as denoting a certain Greek tribe which inhabited Thessaly during the heroic age; and secondly, as equivalent to our term prehistoric. The name is more especially applied to the natives of Thrace, who seem to have belonged to the Illyrian stock. In modern times it has served as the watchword of all kinds of obsolete theories and prescientific fancies. We know nothing about the Pelasgian language' (Professor A. H. Sayce). There seems to be no certain evidence that any Pelasgian tribe settled in Italy.

PELORISATION (*pelorios*, monstrous: *Gr.*), in Botany, the property of assuming an exceptional and unusual form. Thus a flower which has five stamens instead of the normal number of four, is a pelóric flower.

PEPSINE (*peptein*, to digest: *Gr.*), a nitrogenous substance existing in the gastric juice, and as a viscid matter in the peptic gland and on the walls of the stomachs of animals. This is extracted from the stomachs of the hog, sheep, or calf, and made into various preparations taken as remedies in cases of defective digestion.

PERPENDICULAR STYLE, in English Gothic Architecture, or, as it is sometimes called, the Third Division of the Pointed Style, was employed from the latter end of the fourteenth to the early part of the sixteenth century. The tracery of the windows exhibits perpendicular and horizontal lines. The doorways have four centred arches and horizontal lines; the groinings are decorated with fanlike tracery; and the surfaces of the buildings are enriched with upright forms of panelling. Henry VII.'s Chapel at Westminster Abbey, St. George's Chapel, Windsor, and King's College Chapel, Cambridge, are three striking examples of this style.

PERPETUUM MOBILE (perpetual motion: *Lat.*). [See PERPETUAL MOTION.]

PERSEIDES, a name of the meteoric shower of the 10th of August, so called because it appears to issue from the star Algol in the constellation Perseus.

PERSIAN LANGUAGE, the most important of the Iranic tongues. The ancient Persian is only known from some inscriptions. The middle Persian, or Pehlevi, was the language of the epoch of the Sassanides, from the third to the seventh century; then came the Parsee, and afterwards (since the year 1000) the modern Persian. This contains many Arabic words.

PERTURBATIONS, in Astronomy, those deviations of the heavenly bodies from their elliptical paths which take place in consequence of their mutual attractions. The *periodic* perturbations are those which are compensated after a limited number of revolutions and then begin again; these are called inequalities depending on configurations. The *secular* perturbations require a great length of time for their consummation, and before they recommence their long periods. The motions of the moon display the most considerable perturbations.

PHALANSTERY, in the system of the French socialist Fourier, the common residence and collected workshops of a phalanx—that is, 400 families.

PHENOL, PHENYLE, names given to CARBOLIC ACID (*St.*).

PHILIPPIUM, a rare metal lately found by M. Delafontaine, in the Samarskite earth of North Carolina, named after a physicist of Geneva. Its equivalent is 74.

PHONAUTOGRAPH (*phone*, sound; *autos*, itself; *graphe*, writing: *Gr.*), in Acoustics, an instrument for graphically representing the vibrations of a sonorous body. It also affords a means of counting the number of vibrations in a given time. The vibrations required to be represented are made to affect the air inside an apparatus which is something like an ear-trumpet, across the narrow end of which is stretched a membrane. To this membrane is attached a marking style, which is brought into contact with a piece of smoked paper placed upon a cylinder capable of being moved both horizontally and round its axis. When the vibrating body is set in motion the membrane vibrates in correspondence, and the style draws a tremulous line upon the paper upon the cylinder, the latter being at the same time made to move by turning a handle which works a screw.

PHONOGRAPH (*phone*, sound; *graphe*, writing: *Gr.*), an apparatus invented by Mr. T. A. Edison, of New York, by means of which it is said that 'words spoken by the human voice can be stored up and reproduced at will over and over again hundreds of times.' It consists of three parts—a receiving, a recording, and a repeating apparatus. The first is a tube into which the words are spoken, at the farther end of which is a thin metal diaphragm, having a small pin attached to its centre. The second part consists of a cylinder capable of being revolved on its axis, and having a coat of tin foil which the pin just touches. This cylinder being made to revolve slowly whilst the vibrations caused by the speaker's voice, first in the air of the tube, and then in the diaphragm and its attached pin, drive the latter against the tin foil, where they make a series of indentations. The words being thus printed upon the strip of metal, their sound having been converted into a visible form, the next step is to reconvert them into sound, and for this purpose the third part of the apparatus is employed. This consists of a tube, one end of which is covered with paper stretched taut. Upon this paper plays a pin attached to a steel spring, which, being brought into connection with the pin of the receiving apparatus the whole is ready for action. Now if the motion of the cylinder be repeated in such a way as to cause the pin of the transmitting part to pursue its former path, and to fall into the series of indentations it had previously made, the vibrations thereby caused in the attached metallic diaphragm are conveyed to the steel spring, repeated by its pin upon the paper diaphragm, and conveyed along the tube to the ear of the listener.

PHONOGRAPHY (*phone*, sound; *graphe*, writing: *Gr.*), the system of writing words phonetically—that is, in the way they are pronounced, one unvarying sound being given to each letter. The sounds of the English alphabet and the spelling of the words being extremely irregular, many attempts have been made to introduce a system of phonography. [See LETTERS (*St.*).]

PHOTOGRAVURE, a French process for etching a design which has been first drawn on the metal by a photographic method.

PHOTOHELIOGRAPH (*phos*, light; *helios*, the sun: *Gr.*), an apparatus for obtaining photographic pictures of the sun's surface. The sun is thus made to take his own likeness.

PHOTOSPHERE (*phos*, light; *sphaira*, a ball: *Gr.*), the visible surface of the sun.

PHTAH, the creator of the world in Egyptian Mythology, especially worshipped at Memphis. He was usually represented as a man with a cap fitting tightly to his head, holding or leaning against the Nilometer, the emblem of stability. The scarabæus was also his symbol.

PHYLLOTAXIS (*phullon*, a leaf; *taxis*, order: *Gr.*), in Botany, the arrangement of the leaves on a branch; thus, leaves are sometimes opposite, sometimes spirally arranged.

PHYLLOXERA (*phullon*, a leaf; *xēros*, dry: *Gr.*), a small insect, the *Phylloxera vastatrix* of entomologists, belonging to the family of Aphidæ, which, originating in North America, has got into the vineyards of Europe, where it has done and is doing immense damage. The French Government has offered a large reward to the discoverer of a cheap and easy remedy against its ravages. The insect is at first yellow, and afterwards greenish. It has an oval shape, and is furnished with six legs, a proboscis, and a pair of antennæ. Whilst wingless it passes the winter at the root of the vine, and in the spring attacks the fibres, into which it bores with its proboscis. It lays from thirty to forty eggs, which are hatched in eight days, and the young insects in a short time proceed to lay eggs which are hatched in the same way, a case of PARTHENOGENESIS. In the course of the summer there are from six to eight generations, and thus a single female may be the ancestor in a few months of thirty millions of individuals. Some individuals of the later broods creep up the stem into the air. Each of these receives two pairs of long wings, and lays four eggs, which produce males and females. Each of the latter, after impregnation, lays in the bark of the vine a single large egg, from which an insect is hatched in the spring. This attaches itself to the roots of the vine, and the same round is gone over again. Sometimes the wingless insect lives in little galls on the under side of a leaf. Such is the curious history of this destructive insect. Its attacks cause the fibres of the root to swell into knots and knobs; they then decay, the plant becomes sickly and finally dies. It is the general opinion that the American vines do not suffer so severely from Phylloxera as European vines, and the former have been largely imported for the purpose of being planted as stocks for grafting.

PHYLOGENESIS (*phule*, a race or tribe; *genesis*, generation: *Gr.*), the mode of evolution of a race or organic type, for example, the vertebrate type. It is affirmed by anatomists that there is a correspondence between the development of the individual [ONTOGENESIS (*St.*)] and that of the race. The history of the formation of the vertebral column is pointed out as a good example of this correspondence, for all the stages which occur in the gradual evolution of that osseous system in the series of vertebrate animals, are repeated in the successive stages of the embryonic development of the higher members of the series. Again, Professor Allen Thomson states that the study of the comparative anatomy of the heart and its mode of formation in the embryo furnishes most striking illustrations of the relation between ontogenetic and phylogenetic development in the vertebrates. The final generalisation is that the ontogenetic development of the individual in the higher animals repeats in its more general character, and in many of its specific phenomena, the phylogenetic development of the race.

PHYSIC NUT, the fruit of the *Jatropha curcas* (or *Curcas purgans*), nat. order *Euphorbiaceæ*, which is cultivated in tropical countries for the sake of its oil, which is purgative, and is used for burning in lamps. The Chinese make a black varnish by boiling the milky juice of the plant with oxide of iron.

PHYSIOGRAPHY (*phusis*, nature; *graphe*, writing: *Gr.*), any description of the powers and processes of nature.

PIBROCH (*Gaelic*), martial music played on the bagpipes, not the instrument itself.

PICRIC ACID (*pikros*, bitter: *Gr.*), may be obtained by the action of nitric acid on indigo and numerous other substances, such as silk, wool, salicine, &c It forms pale yellow scaly crystals, which are sparingly soluble in cold water, and possess an intensely bitter taste. Picric acid is used in dyeing.

PIGEON PEA, the pulse of a leguminous plant, *Cajanus Indicus*, which is largely cultivated in tropical countries as affording a nutritious esculent. In India the pulse is called Dhal.

PIPUL or PEEPUL, the *Ficus religiosa* of botanists, the Sacred Fig of India, round which many superstitions cluster. The leaf is remarkable for having its apex drawn out into a long point. It is the custom of the Hindoos to plant two of these trees near together with a Neem tree (*Margosa*) between, and to go through an elaborate ceremony of marrying the pipuls.

PISCINA (a pool or cistern: *Lat.*), a stone basin or small trough with an outlet at the bottom, placed near the altar in churches. Amongst the ancient Romans piscina signified both a fish pond and a swimming bath.

PLANETS. The masses of *Uranus* and *Neptune* have been recently calculated by Professor Newcomb to be respectively the 1-22,600th and 1-19,380th of that of the sun. *Jupiter's* mass is equal to 1-1047th of the sun's. The time of the rotation of *Saturn* has been newly determined to be 10h. 14m. 24s. The existence of a planet between Mercury and the sun has been suspected and much searched for, but hitherto without success. It has been ascertained that *Venus* has an atmosphere. Her light at its greatest brilliancy is equal to about 1-800th of the light of the full moon.

PLANTIGRADES (*planta*, the sole of the foot; *gradiri*, to walk: *Lat.*), a tribe of carnivora, which in walking place the sole of the foot on the ground. It includes the bear, badger, racoon, common otter, and sea-otter.

PLANULA (*planus*, flat: *Lat.*), in Zoology, the ciliated larva of a hydroid zoophyte.

PLATYRRHINE (*platus*, broad; *rhin*, the nose: *Gr.*), a term applied by anthropologists to races of man with broad noses, *e.g.*, the negroes. The monkeys of the American continent are platyrrhine. [See CATARRHINE.]

PLEXUS (interwoven: *Lat.*), in Anatomy, the networks of nerves which are found in several parts of the body.

PNEUMATIC TUBE, a subterranean tube constructed for the transmission of articles from one place to another. The articles are placed in a receptacle which exactly fills the width of the tube, and the motion is effected by exhausting the air in front of it, or forcing in compressed air behind it. There are pneumatic tubes in use between the General Post Office, London, and some of the railway stations.

POLAR DISTANCE, in Astronomy, the angular distance of a star or point in the heavens from either the north or south celestial pole. Polar distance and declination are complementary.

POLYCHROMY (*poluchromos*, many coloured: *Gr.*), the property of having many colours; often used with reference to the buildings and sculptures of ancient Greece, which it is known were coloured. *Polychromatic*, having many colours, in opposition to *monochromatic*, having only one.

POLYGONACEÆ (*polygonon*, knotgrass: *Gr.*), an order of monochlamydeous plants, chiefly herbs or shrubs, distributed all over the world. The genera *Fagopyrum* (Buckwheats), *Rumex* (Docks and Sorrels), and *Rheum* (Rhubarbs), as well as many common weeds, belong to this order.

POLYHISTOR (a learned man: *Lat.*), the title of a compendium of geography containing a sketch of the world as known to the ancients; written by C. Julius Solinus, who flourished about A.D. 238. Also a title given to the grammarian Cornelius Alexander, who, when a soldier in the army of Mithridates, was taken prisoner by Sylla and brought to Rome as a slave. He received his freedom on account of his learning, and became rich. Only fragments of his works remain.

POLYMORPHISM (*polus*, many; *morphe*, form: *Gr.*), the property of having several forms.

POST OBIT (*post obitum*, after death: *Lat.*), a term applied to an instrument such as a bond, which is not to take effect or be enforced until after the death of a person living at its date.

PRAKRIT, a name given by Oriental scholars to any Aryan vernacular tongue in India. The Hindi, Punjabi, Sindhi, Gujarati, Marathi, Orija, and Bengali are the principal Prakrit languages.

PRECONISATION (*preconiatio*, high commendation: *Low Lat.*), the ceremony which takes place at a consistory of cardinals at Rome, when an ecclesiastic is proposed by the Pope to fill the office of bishop. To preconise formerly meant to summon into court, *voce præconis*, by the voice of the public crier.

PREDELLA (a footstool: *Ital.*), the row of little pictures often placed by the old masters at the foot of a large picture.

PREFET (*Fr.* from *prefectus*: *Lat.*), in France the chief civil official of a department, acting under the orders of the Minister for the Interior. The corresponding official in Italy is styled Prefetto.

PRESTER JOHN, a mythic king of the Middle Ages ruling in Abyssinia or Ethiopia. He was supposed to be a Christian and to derive his name Prester from priest as having converted his subjects.

PRIMULACEÆ, in Botany, a natural order of plants, with monopetalous flowers, containing some ornamental garden plants (primula, polyanthus, auricula, cyclamen, &c.), and some well-known wild plants (the primrose, cowslip, pimpernel, &c.), but none of any marked utility. The Chinese primrose, *Primula Sinensis*, is much cultivated. Polyanthuses are distinguished by gardeners into pin-eyed when the pistil projects and the stamens are very short, and thrum-eyed when the pistil is very short and the stamens conspicuous.

PROLETARIAN. The sixth and poorest class of the citizens of Rome, in the constitution ascribed to Servius Tullius, were called *proletarii*, because their only means of aiding the state was by their offspring (*proles*). At present the term proletarian is applied to the class of work-people without capital.

PRONAOS (*pro*, before; *naos*, a temple: *Gr.*), that part of a temple which projected in front of the rest, forming what we now call a portico.

PROPÆDEUTICS (*propaideucin*: *Gr*), preliminary instruction; preparatory science.

PROPYLÆA (*propulaion*, a porch or portico: *Gr.*), the entrance to a Greek temple consisting of an enclosure flanked by buildings with a great gateway.

PROTOPLASM (*protos*, first; *plasma*, material for moulding: *Gr.*), a nitrogenous, hydro-carbon compound, forming the raw material of all animal structure. It is a formless mass of granules and slimy matter, possessing the vital properties of assimilation, irritability, and reproduction. It is the most elementary of all organic substances. The contents of animal cells usually consist of protoplasm. Sarcode, of which some minute animals entirely consist, is composed of protoplasm. [See AMŒBA (*St.*).]

PSYCHROMETER (*psuchros*, cold; *metron*, measure: *Gr.*), a name sometimes given to the combination of thermometers with wet and dry bulbs employed for ascertaining the quantity of moisture in the air at the time of observation. One bulb being kept moist, the mercury falls to a point depending upon the amount of evaporation, and that again depends on the temperature and the quantity of moisture already in the air. The readings of the thermometer and that having the dry bulb afford data for solving the problem. Such a combination of instruments is known on the Continent as August's Psychrometer, and in England as Mason's Hygrometer.

PTERYLOGRAPHY (*pterux*, a plume; *graphe*, writing: *Gr.*), the study of the development, growth, arrangement, &c., of the plumage of birds.

PURBECK STONE, an ash grey sandstone, quarried at Purbeck in Dorsetshire, and much employed by London builders.

PUSHTOO, the language of the Afghans, one of the Iranic tongues.

PYRAMIDION (little pyramid: *Gr.*), the pyramidal top or termination of an obelisk.

PYRHELIOMETER (*pur*, fire; *helios*, the sun; and *metron*, measure: *Gr.*), an instrument devised by Pouillet for measuring the amount of heat radiated from the sun. He computed that the heat received annually by the earth from the sun would be sufficient to melt a coat of ice 98½ feet thick surrounding our globe.

Q

QUALITATIVE, QUANTITATIVE. These words are frequently employed in speaking of chemical analysis. The former signifies that the mere presence of a particular body is sought or has been ascertained; the latter that its absolute or proportionate quantity is the object of research.

QUANTIFICATION OF THE PREDICATE, in Logic, the attaching some word or mark to the predicate of an affirmative proposition to indicate that it is applicable to something besides the subject; in other words, when the predicate is undistributed. For instance, by the proposition, All horses are quadrupeds, it is not intended to assert that the attribute of possessing four legs is confined to horses. To mark this limitation of meaning, Sir William Hamilton, of Edinburgh, proposed to add the word *some*, and to write the proposition in this way: All horses are some quadrupeds.

QUARRY (*carré*, square: *Fr.*), a pane of glass.

QUATERNARY EPOCH (*quaternarius*, four: *Lat.*), in Geology, the modern epoch which commenced at the close of the Tertiary period, and now exists. It is often termed Postpliocene.

QUATERNIONS, CALCULUS OF (*quater*, four times: *Lat.*), a Symbolical Geometry invented by Sir W. R. Hamilton, of Dublin, depending upon four irreducible geometrical elements. 'It is only now beginning to be understood,' says Mr. W. Spottiswoode, 'and has not yet received all the applications of which it is doubtless capable. It must always hold its position as an original discovery, and as a representative of one of the two great groups of generalised algebras, viz., those the squares of whose units are respectively negative unity and zero, the common origin of which must still be marked on our intellectual map as an unknown region.'

R

RA, the Egyptian god of the sun, represented sometimes in the human form with the flesh coloured red, bearing on the head the sun's disc encircled by the viper or uræus, the type of dominion; sometimes by a hawk-headed man surmounted by the atf or high conical cap flanked by ostrich feathers; sometimes by a male sphinx or a hawk.

RACHIS (*rachis*, the spine: *Gr.*), in Botany, the general axis of inflorescence, that is, the primary axis of a spike or raceme of flowers; also, the stem of the frond of a fern above the stipe or stalk.

RADIOLARIA, a division of the Rhizopoda. The animals are marine, and of a low type of organisation. Some species are simple, others compound; some have neither spicula nor shell, whilst others have either silicious spiculæ or silicious shells. The POLYCYSTINA, whose beautiful fossil shells are well known to microscopists, belong to the Radiolarians.

RADIOMETER (*radius*, a ray; *metron*, measure: *Gr.*), an apparatus invented by Mr. W. Crookes, consisting of vanes of pith, each blackened on one side whilst bright on the other, mounted on arms attached to a movable axis, and enclosed in a glass vessel from which the air is exhausted as much as possible. When exposed to the light the axis carrying the vanes begins to revolve. It was at first thought that the motion was caused by the action of light, and hence the apparatus was styled a Light Mill; but it was afterwards found that the motion is due to the action of heat on the molecules of attenuated air still left inside the glass, on these coming into contact with the blackened discs, or, as it has been expressed, the repulsion of the discs results from radiation due to an action of thermometric heat between the surface of the moving body and the case of the instrument through the intervention of the residual air. Mr. Crookes afterwards devised a form in which the heater is stationary and the cooler rotates. This he called an Otheoscope (*otheo*, I propel; *scopein*, to see: *Gr.*).

RAMBUTAN (hairy fruit: *Malay*), the fruit of a tree cultivated in the East Indies, the *Nephelium lappaceum*, nat. order *Sapindaceæ*. The fruit is about the size of a small plum; it grows in clusters, is red and hairy outside with a semi-transparent white pulp, which contains a subacid juice. To the same genus belong two esteemed Chinese fruits: the Leechee, which is produced by the *Nephelium Litchi;* and the Longan, the Long-yen, or Dragon's eye, of the Chinese, the *N. longana*.

RANCHEROS (*Span.*), the cattle-breeding people of Mexico, who are excellent horsemen. They are so termed from their residences called *ranchos*.

RANGE FINDER, in military affairs, an apparatus for discovering the distance of an object from the gun in order that the proper charge of powder may be used. There are many contrivances for this purpose.

RAPPISTS, the followers of George Rapp (d. 1847), a German enthusiast who settled in the United States, and founded the colony known as Harmony, near Pittsburg.

RAPTORES (*raptor*, a robber: *Lat.*), an order of birds of prey, including eagles, falcons, hawks, owls, &c. They have powerful hooked beaks and talons, and great strength of wing. They are divided into diurnal birds of prey with eyes directed sideways, and nocturnal birds of prey with eyes directed forwards.

REACTION, a word borrowed from the French to signify chemical action

RECTIFICATION, in Mathematics, the ascertainment of a straight line equal in length to a given curve.

RECTILINEAL FIGURE, one that is bounded by straight lines.

REED PIPE, in organs and harmoniums, a pipe furnished internally with an elastic metal plate called the tongue, attached at one end and free at the other. By its vibrations it alternately opens and closes an aperture through which the wind is driven and so produces a musical note

REFLEX ACTIONS, in Physiology, are those motions of our bodies which answer to a stimulus without the intervention of the will (being therefore automatic and involuntary), such as the action of the heart, the expansion and contraction of the chest in breathing, and the rapid withdrawal of the hand if suddenly pricked. These and similar actions are believed to be stimulated through the spinal cord and the base of the brain in connection with it, without involving the rest of the brain.

RELAY, in Electric Telegraphy, an apparatus which, on receiving a feeble current from a distance brings into the circuit a much stronger current derived from a battery on the spot Relays are employed in the course of long lines which could not otherwise be worked through from end to end—or when currents arrive at a station too much enfeebled to indicate their purpose clearly without assistance.

RELIQUARY, a case or frame, often richly ornamented, for holding the relics of saints preserved in Roman Catholic churches.

REPOUSSÉE WORK (*œuvre repoussée: Fr.*), ornamental metal-work in low relief, produced by beating the design up from the back by means of a punch and hammer. The work can be afterwards finished by chasing or other process.

S

SACCHAROMETER. [See p. 654.] In order to determine the quantity of sugar in cane or beetroot juice, instruments have been invented by which the test of polarised light can be employed in place of or in addition to the use of a density apparatus.

SACHEM, the chief of a tribe of North American Indians.

SAKI, a spirit distilled from rice by the Japanese, who drink it hot out of small cups

SALICYLIC ACID is the oxide of a compound salt-radical called salicyl, which is composed of carbon, hydrogen, and oxygen. It is in the form of white prisms which have a sweetish-sour taste, and are only feebly soluble in water. It may be obtained from the volatile oil distilled from the flowers of the common meadow sweet (*Spiræa ulmaria*) or from SALICIN. When exposed to a strong quick heat it decomposes into carbonic acid and hydrate of phenol. It is a powerful antiseptic, and is employed for this purpose. The salicylate of soda is employed in medicine.

SAMARIUM, a metal lately discovered by M. Lecoq de Boisbaudran in SAMARSKITE.

SAMARSKITE, a mineral found in North Carolina, remarkable for containing the earths of seven rare metals, viz., Yttria, Erbia, Terbia, Philippia, Decipia, Thorina, and Samaria.

SARACENIC or MOORISH ARCHITECTURE, a peculiar style which received its greatest development in Spain, where many beautiful examples are still to be seen. It is chiefly characterised by the horseshoe arch, the slender proportions and the great number of the pillars, and the profuse use of geometrical ornamentation in mosaics, reliefs, and fretwork upon floors and wall surfaces. A combination of this style with Gothic came to be formed which is very different from the Gothic of Northern Europe. The cathedral at Palermo is often cited as an example.

SARACENS (*Saraceni* in mediæval Lat.), the name given by the Crusaders to their Mohammedan enemies, whether Turks, Moors, or Arabs.

SATIN SPAR, the name given to a fibrous variety of gypsum which when polished has a satiny lustre, and is worked up into beads and other ornamental articles. The name is also applied to a fibrous variety of carbonate of lime for a similar reason.

SATIN WOOD, an ornamental wood used for furniture; that from Ceylon is the wood of the *Chloroxylon Swietenia*, nat. order *Cedrelaceæ*. West Indian satin-wood comes chiefly from the Bahamas, and is now preferred to the East Indian. It is the produce of some species of *Maba*.

SATRAP (*satrapes: Gr.*), the governor of a province in the ancient Persian empire.

SCANDINAVIAN LANGUAGES. These are the East and North German, the extinct Gothic, the Old Norwegian, and the modern Swedish, Norwegian, and Danish; and they form a branch of the German group of the Indo-European tongues. The oldest of the Scandinavian languages is the Old Norwegian, only spoken in some of the remote valleys of Norway and in Iceland, whither it was taken in the ninth century. Scandinavia was the name given by the Romans to this northern part of Europe.

SEMOLINA (a small seed: *Ital.*), a name given to several different articles: a preparation of wheaten flour similar in substance to macaroni and vermicelli; the hard parts of wheat left unground after passing through the mill; the seeds of a grass called *Poa* or *Glyceria fluitans*. *Semola* is said to be the gluten of wheat.

SERENE (*serenissimus* or *serenitas: Lat.*), a title first given in Germany under the form Durchlaucht in 1375, when the Emperor Karl IV. bestowed it on the electors. In the course of time it was given to other reigning princes.

SHEERS, in Engineering, an apparatus employed instead of a crane for lifting heavy bodies. It consists essentially of two inclined spars or beams meeting above the lifting chains working between them.

SHILLING. The following table will show the value of this coin at different periods of our history. Until the year 1300 a pound of silver was coined into 20 shillings, whilst at the present day it is coined into 66.

1066	....£1	0	0	1527	....£2	0	0
1300	 1	0	3	1513	 2	8	0
1349	 1	2	6	1560	 3	0	0
1356	 1	5	0	1600	 3	2	0
1421	 1	10	0	1816	 3	6	0
1464	 1	17	6				

SHINTOOISM, the ancient religion of the Japanese, and still the State religion, but Buddhism and the doctrines of Confucius have been largely adopted by the people. It mainly consists of a belief in spirits.

SINGHALESE, the race forming the principal part of the inhabitants of Ceylon. They profess Buddhism.

SINOLOGUE (*Fr.*), or **SINOLOGIST** (*Sinæ*, the Chinese: *Lat.*), a person learned in the language and literature of China.

SIREN (a sea nymph in Grecian mythology), in Acoustics, an instrument invented by Cagnard de Latour for counting the vibrations of a body producing a musical note. The principle depends on obtaining a series of notes from it by means of air driven through the holes in a circular plate which is thereby made to revolve. The number of revolutions in a given time increases with the pitch of the sound emitted. An axis attached to the revolving plate is connected with a counting apparatus. A note being obtained from it in unison with the note whose vibrations are to be counted is then obtained from it by working a pair of bellows (the unison being ascertained by the operator's ear), and the number of revolutions caused by the particular note in a given time is given by the counting apparatus. The name Siren was fancifully given to the apparatus because sound can be produced by forcing water through it as well as air.

SLAG WOOL, a fibrous material made from the slag of iron furnaces by driving steam or air against a thin current of it, when in a melted state. It can be woven into sheets which are used for coating steam boilers, the substance being a bad conductor of heat. Delicate glassy fibres, very similar to slag wool, are spun by the wind from drops of lava in the crater of Kilauea at the Sandwich Islands, where it is termed Pele's Hair, Pele having been the goddess of fire in the days of idolatry. Analysis shows that it has almost the same composition as a basalt or dolerite.

SLAVS, a race which entered Mœsia and Thrace, from the north in the fifth century. The original *Slavonic* language, a branch of the Indo-European family of tongues, has now seventeen different dialects. Russian, Polish, Servian, Czechian, Bulgarian, &c.

SLIDE VALVES, the valves or moving plates which alternately open and close the orifices by which the steam enters and escapes from the cylinder of a steam-engine.

SNAKE ROOT, the root of a plant, *Polygala senega*, nat. order *Polygalaceæ*. [See SENEGA ROOT.] Other North American plants belonging to the genus *Aristolochia*, are also called SNAKE ROOT.

SNAKE WOOD [see p. 693], a beautiful red wood, variegated with black spots and marks, obtained in tropical South America. It is used chiefly for walking sticks.

SOAP-BERRY, the hard black seed of the *Sapindus saponaria*, a tree belonging to the nat. order *Sapindaceæ*, a native of South America. The fruit is of the size of a cherry, and its pulp can be used instead of soap in washing linen. The seeds are worked up into buttons and beads by the Spaniards.

SOCINIANS, a religious sect, the followers of Fausto Socino, an Italian, born at Siena in 1539. He taught that Jesus Christ had no existence previous to his miraculous birth, and that although he was deserving of the greatest reverence for his teaching and his acts, and as being the appointed medium between God and man, he neither claimed nor possessed the divine nature The modern Unitarians have embraced most of the tenets of Socino

SOROSIS (*soros*, a cluster Gr), in Botany, the name given to a compound fruit formed of a spike of flowers which grow together and become succulent The pine apple and mulberry afford examples of a sorosis In the latter fruit the calyces of many flowers growing close together become succulent and invest the pericarp and seeds

SOTHIAC PERIOD, THE, was used by the ancient Egyptians, and consisted of 1461 wandering years of 365 days, or 1460 fixed years of 365¼ days

SOUND [See p 698] All the conditions as to the transmission of sound through the atmosphere are not yet fully understood, and several facts are still waiting for explanation For instance, when in the course of some experiments a gun was fired at Montlery, it was heard at Villejuif, whilst a gun fired at the same time at Villejuif was inaudible at Montlery Then sound is usually heard farther with the wind than against it but in what manner the audibility of sound is increased or diminished by the action of the wind is not at present clearly defined Again, the increase of audibility produced by wind will sometimes reach several hundreds per cent, when the velocity of the wind has only increased one per cent Sound is often heard better across the wind than with it, and it is thought that there occurs something analogous to the refraction of light Professor O Reynolds has shown that rays of sound in traversing the atmosphere are usually bent upwards owing to the fact that sound travels faster in warm than in cold air, irrespective of density Now as the air is usually warmest near the ground, the lower part of the wave front will advance faster than the upper part, and as the direction of advance is always perpendicular to the front, it will be bent upwards in a curve whose radius will be about twenty miles when the difference of temperature is 1° F

SPECTRUM, SPECTRUM ANALYSIS [See pp 700, 701] In producing the solar spectrum by means of a glass prism, if the refracting edge of the prism is turned towards the ground, then the violet end of the spectrum will be at the top and the red end at the bottom This shows that the red rays are the least refrangible of the visible spectrum, and the violet rays the most refrangible By employing a thermopile and sensitised paper, it is found that the red end has the most heat rays and the fewest actinic rays, whilst the violet end has the fewest heat rays and the most actinic rays, there being a gradual transition in both respects from one to the other It is found, moreover, that heat rays are thrown beyond the visible red end, and actinic rays beyond the visible violet end In the latter case by careful manipulation part of the spectrum beyond the violet may be rendered faintly visible, and then it is seen to be of a lavender grey tint, and to be crossed by dark lines like the more luminous part of the spectrum The luminosity of this part of the spectrum is very weak on account of the absorption which the rays suffer in traversing our atmosphere By a continuous spectrum is meant one like the solar spectrum where the colours meet and pass successively one into another A discontinuous spectrum is one composed of separate bands or lines with blank spaces between The former kind of spectrum is given by an incandescent solid or liquid, the latter by a glowing vapour, whether a permanent gas or derived from a volatilised solid or liquid Such a vapour affords a spectrum of bright lines peculiar to it, so that it can be recognised whenever the lines make their appearance When an incandescent solid or liquid is seen through a glowing absorbent vapour, the spectrum from the solid or liquid is continuous with lines from the vapour across it These lines will be dark if the solid or liquid body is of a higher temperature than the vapour, and bright if the vapour has the higher temperature If the solid or liquid body and the vapour have the same temperature, the lines will vanish because the vapour will emit as much light as it absorbs The spectrum of the electric spark is a bright line, one made up of the spectra of the vapours between which and through which the spark passes By subjecting the vapour operated upon to pressure, the lines, in the case of some chemical elements, are thickened, and in the case of others, are increased in number By varying the pressure or increasing the temperature, different spectra can be obtained from the same element Thus, in the case of iron, the lines may be increased from one to 460, and in the case of calcium two wholly distinct spectra have been obtained, one pertaining to a low, the other to a high temperature The largest drawing of the solar spectrum that has hitherto been obtained was thirty metres long, from A to H, and it comprised 4000 lines Some results obtained by means of the spectroscope are stated under SUN and NEBULÆ

SPIROMETER (*spiro*, I breathe · *Lat*; *metron*, a measure *Gr.*), an apparatus for measuring the quantity of air given out by the lungs after taking in a long breath. It is employed by medical men to ascertain the lung capacity of a patient.

SPIRULA (a little coil: *Lat.*), in Zoology, a genus of ten-armed cuttle-fishes furnished with a shell which is almost covered by the body. The shell is small, white, and many chambered, curled into a flat spiral. It is thrown by thousands on some islands in the Atlantic and Pacific Oceans, but only five specimens of the animal have been seen by naturalists.

SPLINT, a hard excrescence which forms on the shank bone of a horse.

SPONTANEOUS GENERATION. All the evidence hitherto adduced in support of the hypothesis of what is popularly termed spontaneous generation has been shown to be valueless, but it has not by any means been proved, and it would be very difficult to prove, that the lowest forms of life may not be naturally generated when the suitable inorganic materials are brought together under suitable conditions of temperature, pressure, &c., in places not easily accessible to direct observation—at the bottom of the ocean, for instance. We are not to conclude, because proof has not so far been produced, that it cannot be produced at some future time. So to conclude would be bad reasoning, of a character which the progress of geology and astronomy has again and again exposed. The hypothesis of spontaneous generation is not of the nature of a superstition, but is a purely physical one, against which there is no *a priori* impossibility. In the present state of science it is rather one to be styled probable. Proof of the fact is wanting, and that is all. On the one hand, the fact is not to be asserted without full and complete proof; on the other, it is not to be declared an impossibility because it has not yet been proved.

SPORES, RESTING, the oogonia or germs of minute parasitic fungi, such as the potato fungus, the *Phytophthora infestans* of botanists. After being fecundated by the smaller bodies called antheridia, they are rendered capable at the end of a period of rest to germinate and produce new fungus threads which spread through the tuber and render it useless, or to form minute movable sporules or zoospores contained in cases.

SQUARES, LAW OF INVERSE, a law applying to light, heat, sound, and other physical phenomena, which is thus expressed: The intensity of the light, &c., received from any source varies inversely as the square of the distance.

SQUARES, METHOD OF LEAST, one of the most useful applications of the calculus of probabilities, the object being to obtain the most probable result from a number of observations which have given different results though all are believed to be equally trustworthy.

SQUASH, the name given in the United States to the numerous varieties of pumpkin, *Cucurbita melopepo*, cultivated for table use.

STAFF, in Music, the five horizontal lines on or between which the notes are placed.

STANNITE (*stannum*, tin: *Lat.*), an ore of tin, the oxide.

STICHOMETRICAL (*stichos*, a rank or row: *Gr.*), a term applied to an arrangement according to the subject-matter, not alphabetical.

STIGMARIA (*stigma*, a mark or spot: *Gr.*), the roots of fossil trees belonging to the genus *Sigillaria*, characteristic of the Carboniferous period, and believed to be related to Cycads. Stigmariæ were long thought to be distinct plants until the roots were discovered in connection with the stems of Sigillaria. The peculiar markings on the roots gave origin to the name.

STILUS (*Lat.*), the small iron rod employed by the Romans for writing upon tablets coated with wax. One end was sharp for tracing the letters, and the other end was made broad for erasing, when desirable, what had been written. Hence Horace recommends a writer for the public to turn his stilus frequently. The stilus was therefore an ancient pen, and the word came in time to signify the composition or manner of writing; whence our word *style*.

STŒCHIOMETRY (*stoicheion*, a first principle: *Gr.*), that branch of Chemistry which is concerned with the laws of the combination of bodies by weight and volume. [See AFFINITY.]

STOMATA (mouths: *Gr.*), in Botany, minute openings through the epidermis of the leaves of plants. The opening is usually between a pair of semi-lunar cells. It is supposed that the office of the stomata is to regulate the evaporation from the chlorophyll of the leaf, becoming larger or less according to the hygrometrical state of the atmosphere.

STONE AGE, in Anthropology, that period in the history of a people when their only cutting implements were made of flint, obsidian, or other stone. Ancient implements of this kind are often found in caves or buried in river gravel in various parts of Europe. Two periods have been distinguished. In the earlier (termed *palæolithic*, from *palaios*, ancient, and *lithos*, a stone: *Gr.*), the implements were rudely made by a simple chipping of the stone without any attempt to make the surface even. In the later they were rubbed smooth, and these are termed *neolithic* (*neos*, new: *Gr.*). Some races have emerged from their stone age long ago, others are still living in it. When the use of bronze was discovered stone implements ceased to be made.

STREAM LINES, THEORY OF, in Shipbuilding, a new mathematical theory worked out by Mr. W. Froude, in regard to the resistance encountered by ships when moving in the water. 'The whole framework of thought by which the search for improved forms is universally directed, consists of ideas, which, if the theory of stream lines is true, are absolutely delusive and misleading.' The only causes of resistance to the motion of a ship through water are, first, surface friction, which in the case of large ships is by much the largest item; secondly, the mutual friction of the particles of water, and this is only felt when there are features sufficiently abrupt to cause eddies, so that it may be neglected in any well-designed ship; and, thirdly, wave resistance, the data for determining which, must be obtained by direct experiment with different forms to ascertain its amount for each form, the experiments being directed to discover the wave resistance of all varieties of water-line cross section, and proportion of length, breadth, and depth, so as to give comparative results of different forms, as well as the absolute results of each. 'In order to reduce wave resistance, we should make the ship very long On the other hand to reduce the surface friction, it must be made comparatively short, so as to diminish the surface of webbed skin. Thus endeavour must be made to reconcile conflicting methods of improvement; and to work out the problem in any given case, we require to know actual quantities.' As to what has been called direct head resistance, the notion is declared to be a complete delusion, for it can be shown that there is no opposing force due to the inertia of the water on the area of the ship's way. Indirectly the water causes resistance to a ship at the surface, because the pressures due to it make waves; but to a submerged body, or to the submerged portion of a ship, no resistance will be caused by the inertia of the water which is pushed aside. The theory of stream lines shows that a submerged body, if moving through a perfect fluid at uniform speed, would encounter no resistance whatever.

STRIGIL (*strigilis: Lat.*), a scraper made of horn or metal employed by bathers for removing the impurities of the skin. It is often seen in the hands of athletes in ancient works of sculpture.

SUBJECT, OBJECT, terms employed in Mental Science to denote the mind, self, or ego, and the external world or the non-ego. Thoughts and volitions, pleasures and pains, are subjective; are part of ourselves. Whatever comes to us through our senses, the impressions derived from those things that seem to be external to us, are objective.

SUDATORIUM (*Lat.*), a room in a Roman bath where the air was heated to cause perspiration.

SUFFICIENT REASON, PRINCIPLE OF. This so-called law or principle affirms that certain conditions attend every fact and event, constituting the reason why they exist or have happened. It was put forward by Leibnitz to explain moral necessity, by which he understood the mind selecting the best or following the strongest inclination.

SUFFIX (*sub*, under; *fixum*, to attach: *Lat.*), an addition to the end of a word indicating some change in the meaning. Thus, in heirship, childhood, boldness, freedom, the last syllable in each is a suffix.

SUMMUM BONUM (the highest good: *Lat.*), that the discovery and acquisition of which ought to be the great end and aim of life. Plato and Aristotle thought that the highest happiness of man was philosophy or the pursuit of truth, and that was only attainable by the practice of justice and virtue. Butler and others make virtue not happiness the highest object of man.

SUN. This splendid body having been very closely scrutinised by many observers, much new information has been gathered as to his constitution, though much still remains to be learned. It was formerly supposed that the sun's body was dark, but surrounded by a glowing atmosphere, the photosphere, and that the maculæ were cavities in that atmosphere through which the body was seen. But it is now thought that the mass of the sun is in a fluid, if not a gaseous, state, and hotter than the surrounding atmosphere. By the constant use of the spectroscope there have been detected in him the metals iron, zinc, copper, aluminium, sodium, magnesium, cobalt, nickel, calcium, chromium, titanium, and manganese, all in the gaseous condition, as well as the gases hydrogen and oxygen. The latter gas was for long unrecognised, and it is supposed to keep for the most part below the visible surface. There is also a bright line, known as No. 1474, amongst the dark lines of the preceding bodies. This bright line has been attributed to an unknown metal, for which the name of helium has been proposed, but some physicists believe it to be a line of hydrogen. It has been found that the sun's spots have a proper motion, those nearer the solar equator moving more rapidly than those which are more distant. Moreover, it has been discovered that the spots are attended with periodical changes, the cause of which is not known. These changes are believed by some to correspond with variations in magnetic declination, in auroras, in the number of cyclones, and in rainfall, and it is thought that the evidence points to a common cycle. It has even been suggested that commercial crises have relation to the sun's spot periods. With regard to the sun's envelopes we may begin with the atmosphere, which extends some 300 or 400 miles from the surface, and contains the vapourous metals already mentioned. Above this is the *Chromosphere*, or more properly *Chromatosphere*, called also the *Sierra*, with a thickness of from 6000 to 7000 miles, outside which is the *Corona*. The lower part of this is seen round the dark moon when an eclipse is total, as a ring of pearly lustre crossed by radiating lines. In this region are seen those objects of irregular form and position called flames, prominences, or protuberances, which are usually red, but sometimes yellow or violet. These are outbursts of incandescent hydrogen which reach to perhaps 100,000 miles from the sun's surface. The corona extends to about a million of miles from the sun. Its structure is complicated, and the spectroscope shows that it is only partly gaseous, the rest consisting of incandescent solid or liquid bodies. Observations at different eclipses prove that it varies greatly in extent and structure. Beyond the corona long rays have been seen extending as far as five millions of miles from the sun. But this is not all, for there is 'a softened luminosity' which has been traced to the enormous distance of ten millions of miles along the zodiac, and this is thought to be part of the zodiacal light whose mysterious nature has long puzzled astronomers. The brilliancy of the sun's light at the earth's surface is said to be equal to the light emitted by 5774 candles at the distance of 13⅓ inches. It has been computed that the heat received by the earth from the sun in the course of a year would be sufficient to melt a layer of ice spread over the earth to the thickness of 32¾ yards. The sources from which the sun's enormous heat is derived have often formed the subject of speculation. Some have thought that the heat may be caused by the impingement of meteoric bodies upon the sun. Helmholtz suggests that the heat may be produced by the contraction from cooling of the sun's mass. The influence of this great luminary upon the earth is felt in three ways: in consequence of his rotation and our rotation the magnetism of the earth and the meteorological conditions of our atmosphere are affected; then there is a cyclonic effect produced by the meteorological disturbances of his surface; and lastly, there are the effects of light and heat which are caused by the vibrations of his particles. 'It cannot be doubted,' says Dr. Balfour Stewart, 'that a great generalisation is looming in the distance, a mighty law, we cannot yet tell what, that will reach us we cannot yet say when. It will involve facts hitherto inexplicable, facts that are scarcely received as such because they appear opposed to our present knowledge of their causes.'

SUNDEW. [See DROSERA.]

SYMPIESOMETER (*sun*, with; *piezo*, I press; *metron*, a measure: *Gr.*), a peculiar form of barometer consisting of a glass tube bent into a syphon shape, and containing air as well as a non-volatile fluid, usually glycerine. The varying pressure of the atmosphere causes the fluid to rise or fall. The indications thus afforded need correction for the temperature of the air at the time and place of the observation.

SYNOPTIC GOSPELS, a name given to the three gospels of Matthew, Mark, and Luke, because they report the same events in nearly the same way, so that some critics are of the opinion that they were all based upon the same older document; whilst the fourth gospel is marked by discrepancies and the introduction of new views.

SYSTEMIC, in Medicine, what concerns the entire bodily system, not something merely local.

T

TABU, a mystical rite amongst the heathen Polynesians by which an object is rendered sacred. Death or severe punishment is the penalty for infringing tabu. The objects thus protected are usually the property of the chiefs. Captain J. E. Erskine thought, from the accounts given of its operation in the Fiji Islands, that although the services of a priest are sometimes called in to assist, tabu is in fact more a civil than a religious ceremony, and that the fear of offending the chief, who alone has the power of laying on or removing it, rather than the gods, is the cause of its rigid observance.

TACHYGRAPHY (*tachus*, quick; *graphe*, writing: *Gr.*), a method of rapid writing or shorthand.

TALOOKDHAR, the Indian name for the proprietor of a talook or district.

TANGIERINE ORANGE (Tangiers, North Africa), a small orange with an easily separated rind growing on a small-leaved low tree much cultivated on the shores of the Mediterranean. The rind has a strong but agreeable perfume, and the flesh is sweet and juicy.

TASIMETER (*tasis*, tension; *metron*, measure: *Gr.*), an instrument invented by Mr. T. A. Edison, of New York, for detecting and measuring minute variations of pressure by means of an electric current. Variously modified, it can be employed to detect extremely small differences of weight, heat, moisture, &c. It is founded upon the property which carbon, in a state of fine division, possesses of varying its resistance to the passage of electricity under very slight alterations of pressure. A button of carbon formed by compressing the black deposit of a petroleum lamp is placed in the circuit of an electric current, and is subjected to the pressure of the body whose increased or lessened weight, heat, &c., is to be measured. The greater the pressure, the less is the resistance. The variations thus produced are indicated by a galvanometer through which the current is made to pass. The apparatus thus forms a thermometer of marvellous delicacy, and the inventor believes that it will show a difference of temperature as small as the 1-50,000th of a degree Fahrenheit.

TASMANIANS, the native people of Van Diemen's Land or Tasmania, the last survivor of whom, an old woman, died in 1876. In many respects they resembled the Australians, but differed from them in having crisp, almost woolly hair in place of flowing and silky hair.

TECHNICAL EDUCATION, that instruction which should succeed the elementary teaching of the child in order to prepare him for the life of a handicraftsman. Before he applies himself to the engrossing labours of the workshop, a foundation of principle should be laid by which the practical details of his business would be more easily learned and better understood. And along with principles should be taught various useful arts, such as drawing and mental arithmetic, which would be of service to him in every part of his career. Such a technical education as is here referred to would not only render the recipient a better workman, but would make his work more pleasant and his life more enjoyable. In many Continental countries schools have been established for giving instruction, not only in the lower grade of handicrafts, such as weaving, dyeing, lace-making, watch-making, &c., but to a higher grade, such as engineering in its numerous branches. These higher grade places of instruction are known as Polytechnic Schools or Technological Institutes. One of the best of them is at Zurich, in the poor country of Switzerland, and so excellent is the instruction given here, that pupils are attracted to it from all parts of Europe. Very little has been done hitherto in this direction in the wealthy empire of Great Britain, although technical schools are nowhere more needed.

TELEOLOGY (*telos*, an end or purpose; *logos*, a discourse: *Gr.*), the doctrine of final causes, or the argument that the purposiveness of things affords proof of the existence of a Creator.

TELEPHONE (*tele*, far off; *phonos*, sound: *Gr.*), an apparatus for transmitting spoken words or other sounds to a distance. Several contrivances have been devised for this purpose, the first having been that of a German named Reuss in 1861. Of the recent inventions, that of Mr. Graham Bell may be selected for description. It consists of three parts, two of which, the transmitting instrument and the receiving instrument, are exactly alike, and each may be used successively for the two purposes. Each consists of a thin iron diaphragm, about two inches in diameter, held in a wooden ring. The intermediate portion of the apparatus is more complicated. There is, first, at the transmitting end, a bar magnet, which is adjusted so as to have one end brought very near to the iron diaphragm. To the other end of the magnet is attached a bar of soft iron. This lies in the interior of a coil of well-insulated copper wire, the two ends of which extend to the receiving instrument, wherever that may be. At the receiving end there is a precisely similar arrangement of copper wire coiled round a bar of soft iron, which is attached to a magnet, the end of the latter being brought close up to, without touching, the iron diaphragm of the receiving instrument. It is to be understood that the wire of one coil forms a closed circuit with the wire of the other. Now all being arranged, the person who desires to send a message from A to B, utters it to the transmitting instrument, the diaphragm of which at once begins to vibrate. With every vibration it is thrown into contact with the magnet, from which, by reason of its elasticity, it immediately springs back. In consequence of these makings and breakings of contact, currents of electricity are generated in the coil, and flashed along the wire from A to B, where the operation we have just described is reversed. The electrical current circulating in the coil at B has the effect of increasing the magnetism of the enclosed bar. The diaphragm is thereby alternately attracted and set free in exact correspondence with the apparatus at A. The vibrations caused by the speaker at A, in the diaphragm there, are therefore repeated in the diaphragm at B, and an ear placed at the receiving instrument will hear a repetition of the speaker's words. The hearer may now in turn reply in the same manner, when the apparatus at B becomes the transmitting, and that at A the receiving instrument. On consideration it will be seen, that in working the apparatus there are no fewer than eight transformations: (1.) the speaker's vocal chords cause the air to vibrate; (2.) the diaphragm then vibrates; (3.) the magnetism of the bar is affected; (4.) a current of electricity flows along the wire; (5.) the magnetism of the bar at the receiving end is affected; (6.) the diaphragm at that end is thrown into vibration; (7.) the air then vibrates, and lastly, (8.) the tympanum of the listener's ear must vibrate before he can receive the message. Mr. T. A. Edison has invented another form of telephone, which repeats the message much more loudly than the preceding. This latter invention, which is of more complicated construction, has been brought into use in London, where what is termed the Telephone Exchange has been established. By means of a central office an indefinite number of stations can be brought into connection one with another, and private conversation can be easily carried on by wires passing through this central office when the parties are ten or twelve miles apart.

TEPIDARIUM (*Lat.*), a tepid bathing room in a Roman bath.

TERRIER (*terra*, land: *Lat.*), a list of estates belonging to a manor, of holdings under a landlord, and other similar lists connected with land.

TESSERÆ (*Lat.*), square blocks or tablets of stone or marble for pavements, mosaic work, &c.

TETE-DE-PONT (bridge-head: *Fr.*), in the military art, the fortified post at the end of a bridge to prevent an enemy crossing it.

THAUMATURGY (*thaumatourgia*: *Gr.*), the performance of what appears miraculous; in a bad sense jugglers' tricks.

THERMÆ (*Lat.*), hot springs, or hot baths, from the Greek *thermos*, hot.

THERMO-DYNAMICS, the science connected with the conversion of heat into mechanical work, or mechanical work into heat. The leading law is, that whenever work is performed by the agency of heat, an amount of heat disappears equal to the work performed, and that whenever work is expended in generating heat, the heat so obtained is equal to the work expended. Carnot showed that it is by the transference of heat from a hotter to a colder body that mechanical work is performed.

THRIPS, the gardeners' name for a small insect that infests and injures plants under glass. It is black and shining, with large prominent eyes, and is quick in its movements. It collects in numbers on the under sides of the leaves and of which it attacks the cuticle. It ought to be carefully looked for, and destroyed as soon as it is found.

THYMOL, in Chemistry, the homologue of phenol, or carbolic acid extracted from the oil of *thyme* and some other plants. It is a crystalline, nearly colourless body, dissolving with difficulty in water but readily in alcohol. It has been found useful as a deodoriser of unhealthy wounds, being preferable under some conditions to carbolic acid.

TIDE LEVEL. The mean tide level is an imaginary point equidistant at a given locality from the high and low water marks of an entire lunation. For practical purposes it is assumed to be invariable, though there are reasons to think that there are appreciable changes during the year.

TIMBRE (*Fr.*), in Acoustics, is that peculiar character of sounds by which we distinguish for example the notes of a violin from those of a harp, or one man's voice from another's. It is independent of the loudness or pitch, and is a consequence of the harmonics which accompany the principal note.

TMESIS (a division: *Gr.*), in Latin grammar, the separation of a word into two parts and the insertion of another word between them for metrical purposes. Thus the poet Ennius wrote, 'Saxo cere — comminuit — brum,' for 'Saxo cerebrum comminuit' (He smashed his brains with a stone).

TONOMETER (*tonos*, a musical note; *metron*, a measure: *Gr.*), an apparatus for accurately measuring the number of beats per second made by a vibrating body such as a tuning fork. There are several inventions for this purpose. [See SIREN (*St.*).]

TOPE (*sthupa*, a mound or cairn: *Sans.*), a name given in India to tumuli, pillars, towers, &c., having a sacred or monumental character. They are sometimes large and elaborate architectural structures.

TORPEDO, in military affairs, an iron vessel filled with an explosive material, and used both in attack and for defence, and either on land or under water. The explosive material is usually either gun-cotton or dynamite. [See these articles.] Torpedoes are exploded by electricity or by concussion. The Whitehead torpedo is a narrow cigar-shaped weapon which is driven through the water by means of compressed air. The fish torpedo is another form which is similarly impelled but below the surface of the water. Both of these explode on striking any object. In the case of the latter, if it fails to hit it comes up to the surface, and a trigger guard renders it harmless, and at the same time enables it to be recovered.

TORQUE or **TORK** (*torques*, a twisted neck-chain: *Lat.*), an ornament for the neck worn by the ancient Britons and Gauls, consisting of a chain composed of interlaced rings. Titus Manlius, a hero of ancient Rome, acquired the surname of Torquatus from having taken the *torques* from the neck of a Gaul whom he had slain in battle. Torques are sometimes coiled in a spiral, and then they are really armlets, like the bronze elastic armlets found in Italy.

TOTEM WORSHIP, the worship by a clan of uncivilised people of some particular animal or vegetable from which the clan takes a surname.

TRACHEÆ (*Lat.*), the tubes which penetrate through every part of the bodies of insects by means of continual ramifications for the purpose of aërating the blood. They commence at the external openings called spiracles which are furnished with a kind of sieve very variously formed which prevents the entrance of dust.

TRADE WINDS. [See p. 760.] The anti-trade winds are a consequence of the trades, for the heated equatorial air at first flowing upwards again reaches the surface of the earth at about 30° north and south, and then partly returns to the equator and partly makes its way towards the poles as a south-west wind in the northern, and as a north-west in the southern hemisphere.

TRICHINIASIS or **TRICHINOSIS**, a disease arising from the presence of the microscopic worm called *Trichina spiralis*, which taken into the body with the flesh of a trichina-infested animal rapidly spreads into the whole muscular system. The pig is apt to be troubled with this disease, and hence the danger of eating pork not thoroughly cooked. The disease in man is sometimes epidemic.

U

UGRIO-FINNIC TONGUES, a division of the ALTAIC (*St.*) languages spoken in Eastern Europe and Northern Asia, and comprising the Finn, Lapp, Magyar, and other dialects

UHLANS, German cavalry, armed with the lance, sabre, and carbine.

UNION JACK, the national flag of the United Kingdom. It consists of a combination of the red cross of St George on a white ground for England, the white saltire or cross of St. Andrew on a blue ground for Scotland, and the red cross of St. Patrick on a white ground for Ireland

URTICATING ORGANS (*urtica*, a nettle: *Lat.*), organs for stinging possessed by many water animals of low type. For example, in the tentacles of the sea anemones there are lodged numerous minute capsules, each containing a coiled-up thread carrying at its tip a spiculum This can be darted forth at the will of the animal; and it is supposed that its prey is thus attacked and rendered helpless.

UTRICLE, PRIMORDIAL (*utriculus*, a skin bottle: *Lat*), in Botany, the membrane which lines the inside of a vegetable cell. The external coat of the cell is composed of a non-azotised substance called CELLULOSE. Inside there is at first a mucilaginous azotised matter called PROTOPLASM (*St*), which in the progress of growth forms a layer on the inner wall of the cell. This is the primordial utricle. As the process of lignification advances, the utricle disappears in consequence of its becoming incorporated with the cell wall

V

VALI or **WALI**, the governor of a vilayet or province in Turkey.

VENUS' FLY-TRAP, a North American bog plant, the *Dionæa muscipula* of botanists, nat. order *Droseraceæ*. It is one of the so-called CARNIVOROUS PLANTS (*St.*). The leaves are composed of two lobes with long hairs at their edges. There are some irritable bristle-like hairs on their surfaces, which secrete a fluid which forms a bait for insects. When an insect touches these hairs, the lobes move upwards and the interlocking hairs hold it fast until it dies.

VERA CAUSA (*Lat.*), a phrase applied in reasoning as to the explanation of a given phenomenon to any suggested cause which is recognised as having a real existence in nature, and is not a mere hypothesis or figment of the mind.

VERST, a Russian measure of length equal to 0 621 of a British statute mile (about 3500 feet), and 0·937 of a kilometre.

VESICA (a bladder: *Lat.*), in Mediæval Art, the oval frame or glory pointed at each end, which surrounded the figure of Christ in painted windows, &c. It is conjectured to represent a fish with reference to the Greek word *ichthus* (a fish), an anagram made of the first letters of the words signifying Jesus, Christ, Son, God, Saviour (*Jesos, Christos, uios, theos, soter*).

VIKINGS, the piratical Northmen or Normans who ravaged the coasts of Europe, from the ninth to the eleventh centuries. Some say that the word signifies warriors; others that it is derived from *vic*, a bay, the lurking-place of the robbers.

VINEGAR PLANT, a fungus which has the property of setting up the acetic fermentation in a solution of sugar, and converting it into vinegar, if a small piece of the plant be placed therein. It has received a distinct name from botanists (*Mycoderma aceti*), but it is said to be really the vegetative form of the common blue mould *Penicillium glaucum*, which is thought to be the reproductive form of the same vegetable.

VISCOSITY (*viscosus*, viscous: *Lat.*), a term to express a less degree of mobility in the molecules of bodies than that possessed by fluids such as water. Treacle and liquid-glue are viscous bodies.

VIS VIVA (living force: *Lat.*), in Mechanics, is the mechanical effect of a moving body and is ascertained numerically by multiplying the mass of the body by the square of the velocity.

VOCAL CHORDS, two vibratile chords at the sides of the glottis, a slit-shaped opening in the LARYNX of mammals. The air striking against these bodies when in a state of vibration is the cause of vocal sounds, whether the roar of a lion, the bark of a dog, or the speech of man. All the charms of a singer's voice depend upon these chords. Reptiles have no vocal chords, and consequently they can only hiss.

VULCANITE. [See CAOUTCHOUC.]

W

WAX, MINERAL, a fossil hydrocarbon of a brownish colour, found in bituminous shale in Moldavia. It is allied to PARAFFIN, and has been named *ozokerite* by mineralogists. An extensive bed of a somewhat similar substance, but of a black colour, has been found in Utah, U.S., America. This has been called *zietriskisite*.

WAX, VEGETABLE. Wax is yielded by some palm trees and some plants belonging to the *Myricaceæ, Artocarpaceæ, Terebinthaceæ*, and *Cucurbitaceæ*. The palm wax of the Andes exudes from the trunk of a New Granada palm (*Ceroxylon andicolum*), and forms an article of commerce. A Brazilian palm (*Copernicia cerifera*) affords the Carnauba wax, which is found coating the leaves with white scales. Several species of *Myrica*, growing in North America, Africa, and China, yield wax. Japan wax is the produce of the fruit of the *Rhus succedanea*, a small cultivated tree, and is exported in hard, white blocks. The Japanese make candles of it. The surface of the fruit of the White Gourd (*Benincasa cerifera*) is covered with a secretion known as Petha wax in India.

WEIGHTS AND MEASURES. An Act of Parliament was passed in 1878 (41 & 42 Vict., ch. 49) for the purpose of enforcing uniformity in weights and measures throughout the United Kingdom, and imposing a fine on every person who uses, or has in his possession for use, for trade a weight or measure which is not of the denomination of some Board of Trade standard. All trade contracts and dealings are to be in terms of Imperial Weights and Measures defined in the Act, and all local or customary measures and the use of heaped measures have ceased to be lawful. Exceptions are, however, made from the rule of avoirdupois weight, in the case of gold, silver, platinum, diamonds, and other precious stones. Moreover, the old weights and measures employed by apothecaries remain untouched by the Act. The bronze bar and platinum weight held by the Board of Trade in the Standards department continue to be the Imperial Standards of measures and weights, and the four copies, one at the Mint, a second in the possession of the Royal Society, a third deposited at the Royal Observatory, Greenwich, and a fourth lodged at the Royal Palace, Westminster, are to be deemed Parliamentary Standards.

WELWITSCHIA MIRABILIS, one of the most singular members of the vegetable kingdom, inasmuch as it only puts forth its two cotyledonary leaves, a striking case of arrested development. This uncouth plant belongs to the nat.

order *Gnetaceæ*, and is a native of west tropical Africa, to the south of the equator, where it was discovered by Dr. Welwitsch. It has a rough stem, never exceeding a foot in height, but varying according to age, from a few inches to five or six feet, at the top of which its inconspicuous flowers are annually put forth on small branches.

WINE. The average yearly production of wine in European countries has been estimated to amount to the following quantities (in gallons):—

France	1,225,090,000
Spain	442,000,000
Portugal	110,500,000
Italy	693,003,000
Austria-Hungary	498,300,000
Germany	143,060,000
Switzerland	19,800,000
Russia and European Turkey	47,000,000
Greece and Cyprus	25,000,000
Roumania	14,680,000

WINTER'S BARK, the bark of a tree growing in South America, the *Drimys Winteri*, nat. order *Magnoliaceæ*. The bark was first brought to England in 1579, from the Straits of Magellan, by Captain Winter. It is or was employed in medicine as an aromatic stimulant.

WOMBAT, or Ursine Opossum, one of the pouched animals of Australia. There are three species, two of which are placed in the genus *Phascolomys*. The best known resembles a small bear in general appearance, and is about the size of a badger. It lives in the mountain near Port Jackson, and only issues from its burrow at night.

WORK, MECHANICAL, is exhibited by the displacement of a body by means of force, and is represented numerically by multiplying the force by the displacement it produces in its point of application. The FOOT-POUND (*St.*) is taken as the unit of work

Y

YATAGHAN (*Turkish*), a curved flat sword without a guard, used by the Albanians and Montenegrins. A dagger-shaped two-edged sword of this name was formerly carried by the Janizaries.

Z

ZERO, ABSOLUTE, in Thermometry. It has been found by experiment that atmospheric air, at constant pressure, expands 1-491 of its volume for each degree of Fahrenheit (1-273 for each degree Centigrade). Consequently, if the temperature of a given mass of air at 32° F. (or 0° C.) could be lowered to –459° F. (or –273° C.), the given mass of air would be reduced to a mathematical point. This temperature has received the name of the absolute zero of temperature, and when other temperatures are reckoned from it, they are termed absolute temperatures.

ZITHER, (*cithara: Lat.*), a musical instrument, something like a guitar, with from twenty to thirty strings, and from four to six wires, on which the melody is played by the finger, whilst the others serve for an accompaniment played by the other hand. It had its origin in the Bavarian Highlands.

ZOOLOGICAL GEOGRAPHY, the study of the distribution of animals over the globe and of the causes of that distribution. Such study involves inquiries, not only as to the range in space of the different existing species of animals, but also as to the information afforded by the fossil remains of animals inhabiting a region at an epoch immediately preceding the present—as to the conditions and changes of the earth's surface so far as they bear upon the question of animal distribution—as to the means of dispersal and migration of animals, &c. Much light has been thrown upon the subject by the doctrine of evolution, which has at the same time stimulated and assisted inquiry. Dr. Sclater has mapped out the world into seven great regions, confining himself to mammals, birds, reptiles, batrachians, and fishes dwelling in lakes and rivers:—1. Palæarctic Region. 2. Ethiopian Region. 2*a*. Lemurian Sub-region.

3. Indian Region. 4. Nearctic Region—Arctogæa. 5. Neotropical Region. 5a. Antillean Sub-region—Dendrogæa. 6. Australian Region—Antarctogæa. 7. Pacific Region—Ornithogæa. He has subdivided these regions into several sub-regions. Thus, the Palæarctic Region is portioned into seven:—1. The Cis-Atlantean Sub-region, embracing all that part of the Palæarctic Region lying south of the Mediterranean Sea. 1a. The Atlantic Islands. 2. The European Sub-region. 3. The Siberian Sub-region, embracing the whole of Northern Asia. 4. The Mantchurian Sub-region, containing Northern China and the adjoining part of Mongolia. 5. The Japanese Sub-region, embracing the Japanese Islands. 6. The Tartarian Sub-region, containing the great desert region of Central Asia. 7. The Persian Sub-region, embracing Persia, Asia Minor, and Syria. The Ethiopian Region is divided into:—1. Western Africa, from the Senegal to the Congo. 2. South-Western Africa, or Angola and Benguela. 3. South Africa. 4. South-Eastern Africa, from the Portuguese possessions to the Somali coast. 5. North-Eastern Africa, including Abyssinia, Nubia, and Egypt. 6. Arabia. The Indian Region is subdivided into:—1. British India. 2. Central and Southern China. 3. Burmah, Siam, and Cochin-China. 4. The Malay Peninsula. 4a. Andaman and Nicobar Islands. 5. East Indian Islands. 6. Philippine Archipelago. The Neotropical Region, the richest in animal life of any of the principal divisions of the globe, is portioned into:—1. Central American Sub-region, from Southern Mexico to Panama. 2. Andean or Columbian Sub-region. 3. Amazonian Sub-region, embracing the watershed of the Orinoco and Amazons, up to the hills and including the highlands of Guiana. 4. The South Brazilian Sub-region. 5. The Patagonian Sub-region 6. The Galapagos. Of the Australian Region, the subdivisions are:—1. Australia and Tasmania. 2. Papua and the Papuan Islands. 3. The Solomon Islands. In the Pacific Region, where there are no mammals except bats, birds being the chief form of vertebrate life, there are only three subdivisions:—1. New Zealand. 2. Polynesia. 3. The Sandwich Islands. On this subject, Mr. A. R. Wallace's work on 'The Geographical Distribution of Animals' should be consulted. 'There is nothing,' he says, 'that the study of geology teaches us that is more certain or more impressive than the extreme instability of the earth's surface. Everywhere beneath our feet we find proofs that what is land has been sea, and where oceans now spread has once been land; and that this change from sea to land and from land to sea has taken place not once or twice only, but again and again during countless ages of past time. Now the study of the distribution of animal life upon the present surface of the earth causes us to look upon this constant interchange of land and sea, and this making and unmaking of continents, this elevation and disappearance of islands, as a potent reality, which has always and everywhere been in progress, and has been the main agent in determining the manner in which living things are now grouped and scattered over the earth's surface.'

ZOOSPORES (*zoos*, living; *spora*, seed: *Gr.*), minute bodies which issue from the cells of many species of ALGÆ without any previous process of fertilisation, and after moving awhile through the water by means of ciliæ, settle down to germinate and produce a form resembling the parent plant. The difference between a zoospore and a spermatozoid is that the former, when separated from the parent, becomes encysted and at once developed into a new individual.

ZOUAVES, originally the name of the warlike inhabitants of Zuaua in Algeria; then the bodyguards of the Beys; lastly, French infantry troops, dressed in the Turkish fashion, with turbans, loose jackets, and baggy trousers. The native Algerian troops, in similar uniform, are styled Turcos.

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